# HORTICULTURAL ABSTRACTS

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## INDEX OF CONTENTS.

Initialled abstracts and reviews not by Bureau staff are by A. M. Massee and A. F. Posnette of the East Malling Research Station by M. Hollings of the Plant Pathology Laboratory, Harpenden, and by G. St. C. Feilden and J. R. Llewelyn.


| | | | Nos. |
|---|---|---|---|
| MISCELLANEOUS | Abstr. 80. | Noted 41 | 1004-1085o |
| General | | | 1004-1011 |
| Economics | | | 1012 |
| Statistical design | | | 1013 |
| Biochemistry | | | 1014-1022 |
| Physiology | | | 1023-1032 |
| Environment | | | 1033-1034 |
| Lightning | | | 1035-1036 |
| Growth substances | | | 1037-1049 |
| Tissue culture | | | 1050-1052 |
| Seeds and seed treatment | | | 1053-1059 |
| Nutrition | | | 1060-1063 |
| Soil and soil treatment | | | 1064-1067 |
| Machinery and special devices | | | 1068-1077 |
| Glasshouses and hot beds | | | 1078-1083 |
| Noted | | | 1084a-1085o |
| TREE FRUITS, DECIDUOUS | Abstr. 101. | Noted 21 | 1086-1187u |
| General | | | 1086-1091 |
| Breeding and varieties | | | 1092-1102 |
| Propagation and rootstocks | | | 1103-1112 |
| Growth phenomena | | | 1113-1121 |
| Pollination | | | 1122-1128 |
| Spraying for cultural purposes | | | 1129-1134 |
| Pruning, training and thinning | | | 1135-1139 |
| Nutrition, manuring and soil management | | | 1140-1153 |
| Composition of fruits | | | 1154-1160 |
| Packing and marketing | | | 1161-1166 |
| Storage | | | 1167-1185 |
| Dehydration | | | 1186 |
| Noted | | | 1187a-1187u |
| SMALL FRUITS, VINES AND NUTS | Abstr. 52. | Noted 23 | 1188-1240w |
| Small fruits | | | 1188-1203 |
| Vines | | | 1204-1231 |
| Nuts | | | 1232-1239 |
| Noted | | | 1240a-1240w |
| PLANT PROTECTION OF DECIDUOUS FRUITS | Abstr. 130. | Noted 26 | 1241-1371z |
| Air pollution | | | 1241 |
| Disturbances of nutrition or of unknown origin | | | 1242-1253 |
| Climatic factors | | | 1254-1259 |
| Viruses | | | 1260-1278 |
| Bacteria | | | 1279-1282 |
| Fungi | | | 1283-1310 |
| Nematodes | | | 1311-1314 |
| Mites | | | 1315-1323 |
| Insect pests | | | 1324-1348 |
| Other pests | | | 1349-1351 |
| Biological control | | | 1352 |
| Antibiotics | | | 1353-1355 |
| Fungicides and insecticides | | | 1356-1366 |
| Sprays and spray injury | | | 1367-1370 |
| Noted | | | 1371a-1371z |
| WEEDS AND WEED CONTROL | Abstr. 41. | Noted 10 | 1372-1413j |
| General | | | 1372-1378 |
| Weed control in fruit crops | | | 1379-1383 |
| Weed control in ornamentals | | | 1384-1387 |
| Weed control in tropical crops | | | 1388-1392 |
| Weed control in turf | | | 1393-1396 |
| Weed control in vegetables and tobacco | | | 1397-1412 |
| Noted | | | 1413a-1413j |
| VEGETABLES, TEMPERATE, TROPICAL AND GLASSHOUSE | Abstr. 171. | Noted 38 | 1414-1586l |
| General | | | 1414-1440 |
| Artichokes | | | 1441 |
| Asparagus | | | 1442-1444 |
| Brassicas | | | 1445-1455 |
| Celery | | | 1456-1460 |
| Cucurbits | | | 1461-1471 |
| Legumes | | | 1472-1495 |
| Mushrooms | | | 1496 |
| Okra | | | 1497-1498 |
| Onions and allied crops | | | 1499-1507 |
| Root crops | | | 1508-1523 |
| Salad crops | | | 1524-1534 |
| Spinach | | | 1535-1540 |
| Tomatoes, capsicums and eggplants | | | 1541-1584 |
| Noted | | | 1585a-1586l |
| TOBACCO | Abstr. 68. | Noted 21 | 1587-1655u |
| General | | | 1587-1589 |
| Breeding, selection and varieties | | | 1590-1593 |
| Sowing and planting | | | 1594-1598 |
| Water and other environmental factors | | | 1599-1607 |
| Nutrition | | | 1608-1618 |
| Physiology and biochemistry | | | 1619-1628 |
| Desuckering | | | 1629-1630 |
| Diseases and pests | | | 1631-1644 |
| Curing and fermentation | | | 1645-1654 |
| Noted | | | 1655a-1655u |
| MISCELLANEOUS TEMPERATE AND TROPICAL PLANTS | Abstr. 45. | Noted 18 | 1656-1701r |
| Condiment and spice plants | | | 1656-1661 |
| Drug plants | | | 1662-1669 |
| Essential oils | | | 1670-1671 |
| Fibres | | | 1672-1676 |

| | Nos. |
|---|---|
| Hops | 1677-1685 |
| Insecticidal plants | 1686-1688 |
| Rubber plants | 1689-1691 |
| Seed oils | 1692-1696 |
| Sundry plants | 1697-1700 |
| Noted | 1701a-1701r |
| **Floriculture** Abstr. 80. Noted 33 | 1702-1783g |
| General | 1702-1712 |
| Annual and herbaceous plants | 1713-1723 |
| Bulbs, tubers, etc. | 1724-1741 |
| Lawns | 1742-1744 |
| Orchids | 1745-1747 |
| Succulents | 1748-1750 |
| Roses | 1751-1753 |
| Other trees and shrubs | 1754-1779 |
| Sundry ornamentals | 1780-1781 |
| Noted | 1782a-1783g |
| **Sub-Tropical Fruit and Plantation Crops** Abstr. 78. Noted 37 | 1784-1863k |
| General | 1784-1786 |
| Avocadoes | 1787-1798 |
| Citrus—varieties, rootstocks and nursery practices | 1799-1807 |
| Citrus—planting and pruning | 1808-1810 |
| Citrus—tree composition and nutrition | 1811-1819 |
| Citrus—climatic factors | 1820-1821 |
| Citrus—flower and fruit development | 1822-1824 |
| Citrus—diseases and pests | 1825-1841 |
| Citrus—fruit storage and juice composition | 1842-1851 |
| Dates | 1852-1853 |
| Macadamias | 1854 |
| Olives | 1855-1860 |
| Persimmons | 1861 |
| Noted | 1862a-1863k |
| **Tropical Fruit and Plantation Crops** Abstr. 95. Noted 64 | 1864-1961 l |
| General | 1864-1868 |
| Bananas | 1869-1876 |
| Cacao | 1877-1882 |
| Coconuts | 1883-1886 |
| Coffee | 1887-1900 |
| Guavas | 1901 |
| Mangoes | 1902-1903 |
| Oil palms | 1904-1910 |
| Papaws | 1911 |
| Pineapples | 1912-1916 |
| Rubber trees | 1917-1923 |
| Sugar cane | 1924-1943 |
| Tea | 1944-1951 |
| Sundry crops | 1952-1958 |
| Noted | 1959a-1961 l |
| **Notes on Books and Reports** Abstr. 46. Noted 21 | 1962-2008u |
| Books | 1962-1978 |
| Annuals and reports | 1979-2004 |
| New periodicals | 2005-2007 |
| Noted | 2008a-2008u |


Total abstracts 987. Noted 353.

N.B.—Numbers sub-divided alphabetically refer to items noted but not abstracted.

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## EDITORIAL NOTE

### THE MULCHING OF VEGETABLES

Attention of vegetable growers is drawn to the issue of a new Technical Communication on the mulching of common vegetables—see leaflet enclosed and T.C.24 on back cover.

## SALIENT ITEMS, Vol. 27, No. 2.

### ENVIRONMENT

**Controlled environment rooms:**—A general account of the equipment in use in Britain for providing controlled environments for plants (1034) is supplemented by a description of the growth rooms at Wye College (1033). Details are also provided of a glasshouse suitable for physiological investigations in the tropics (1866).

**Plant variation and selection:**—Environmental and genetical factors causing variation in a field of tobacco plants have been separated (1599).

**Light duration:**—Many deciduous and evergreen trees and shrubs can be made to continue growth indefinitely or to stop growth by altering the photoperiod and temperature (1758, 1759); the response may, however, sometimes vary with the age of the trees (1118). With bryophyllums day-length effects the polarity of the leaves with regard to adventitious bud formation (1023). On the problem of how day-length may influence flower-bud initiation two papers dealing with the supply of soluble carbohydrates under different photoperiods may be helpful (1024, 1025).

**Light intensity and wavelength:**—Light saturation curves for apparent photosynthesis are presented for several sun and shade species (1027), and the effects of light of different wavelengths on growth and flowering are described for various ornamentals (1702). With beans reduction in light intensity can reduce growth and flowering (1478). With tobacco low light intensity and high night temperature can have similar effects in reducing growth and the root : shoot ratio (1600).

**Temperature:**—Night temperature also affects pod development in broad beans, but the growth stage at which plants are most sensitive varies with the variety (1477). With loquats root growth and with asparagus shoot growth are markedly affected by variations in soil temperature (1121, 1443). Interest in seed and seedling vernalization continues with papers on peas (1476), carrots (1509), spinach (1536, 1537) and tomatoes (1420, 1549–1551). A method of estimating the economic risk due to spring frosts of an orchard site is also described (1254).

**Water relations:**—Diurnal variations in the water content of plants tend to increase with both altitude and exposure (1030). The velocity of the transpiration stream in vines varies with species (1210). Peak evapotranspiration rates for different vegetable crops occur in different months (1431), and a mature grapefruit tree may transpire over 3 times as much water per day in summer as in winter (1820). Appreciable amounts of rain are intercepted by the crowns of trees and subsequently lost by evaporation (1151). Soil moisture has a marked effect on nectar secretion (1705) and dew from plants may stimulate pollen germination (1713). Finally, an interesting relationship has been found to exist between rainfall and the potential transpiration of apple trees during the latter part of the summer and the development of "scald" in stored fruit (1179).

## MACHINERY, EQUIPMENT AND METHODS

**Machines and implements:**—Having broken up rocky subsoils (1069) and planted and cultivated vineyards (1219, 1220, 1382) it is possible to pass rapidly to the mechanical harvesting of celery, tomatoes and sugar cane (1460, 1584, 1943).

**Equipment:**—Plastics for irrigation and other purposes (1071, 1072) and more about automatic mist equipment (1075).

**Methods:**—Of measuring soil moisture (1073), painting exposed roots *in situ* for photographing (1077), measuring quality in green peas (1494), and using vegetable oils to make chromosomes spread (1694).

**Packing and cooling:**—Information is provided on carton forming (1162), developments in the packing of apples and pears (1163–1165), disinfecting soft fruit boxes (1203) and new hydrocooling equipment (1074). Economic studies on the packing and marketing of pears and lettuces are also reported (1166, 1531).

## NUTRITION

**General:**—What makes varieties of, say, sugar cane differ in their response to fertilizers (1928–1931)? Is it that their needs differ or do they, like macadamias, have similar needs but differ in their ability to absorb major elements (1854)? Other questions of general interest include the effect of soil organic matter on mineral uptake by tomato plants (1563) and the effects of excess quantities of different types of fertilizer on both tomatoes and lettuces (1528, 1564).

**Analyses:**—Citrus trees remove P from open ground between the rows and redeposit the greater part of it beneath the trees; failure to recognize this may account for some of the low correlations recorded in the past between soil and leaf analyses (1816). In citrus trees, bearing biennially, high Ca and low K contents may be characteristic of the leaves in the winter preceding the off-year (1811). The application of spot tests to tomatoes may also be mentioned (1060).

**N, P, K:**—For tobacco there is further evidence that N requirement varies with the stage of development of the plant (1614). Several papers discuss factors affecting the absorption of $P^{32}$ by plants (1200, 1225, 1948) and one describes exchange studies on $P^{32}$ and $P^{31}$ in tomatoes (1559). In carnations the uptake of Si is directly affected by the supply of K (1716).

**Other elements:**—In tomato plants the free amino acids are increased by deficiencies of Cu, Fe, Mn, and Zn, but depressed by a deficiency of Mo (1560). In tobacco plants total alkaloids are also affected by deficiencies of some minor elements and excesses of others (1617). Papers on individual elements include one which records a relationship between Cu supply and frost resistance (1427), four which describe responses to Fe chelates (1246, 1484, 1791, 1817), and several devoted to various aspects of nutrition with Mg (1458, 1818, 1908, 1909), Mn (1485, 1540, 1561, 1562) and Mo (1452, 1453). There is also information on Ni toxicity symptoms (1428) and on the uptake of radioactive and chelated Zn (1226, 1819).

**Nutrition and plant diseases:**—Examples of relationships include the effect of K status on the susceptibility of apricot trees to brown rot (1297), the control of watercress crook rot disease with Zn-fritted glass (1533), the effects of several elements on the susceptibility of tobacco plants to TMV (1632) and the high Ni content found in hop plants infected with nettlehead virus (1682).

## PHYSIOLOGY

**Growth regulators:**—Has the time arrived when someone (not the writer) might usefully compile a glossary to define exactly what is meant by such terms as promote, stimulate, enhance, advance, inhibit, prohibit, depress, suppress, retard and delay, when describing the effects of growth regulators, growth substances, growth stimulants, growth inhibitors, hormones, auxins and anti-auxins? Among substances which enhance vegetative growth the gibberellins continue to excite interest (1046, 1047, 1674), and the discovery that bean seeds contain their own "gibberellins" is likely to arouse still more (1045). Other

substances, which at suitable concentrations, may "promote" germination or vegetative growth include 2,4-d (1043), coconut milk (1050), glutamine (1052), alcohol (1054), eosin (1055), thiopurines (1527) and a variety of vitamins, enzymes and inorganic compounds applied separately or in combination (1049, 1422, 1596). Further information is available on the role of NAA in sex expression (1462, 1675) and on the use of chemicals to advance flowering and fruiting (1049, 1421, 1912); the last of these makes the additional point that flowering in pineapples is advanced at the expense of slip formation (suckers formed just below the fruit) but does not affect (basal) sucker formation. Finally, there are papers describing fundamental studies on several herbicides, etc. (1044, 1372, 1373) and one paper which suggests that light, though not necessary for auxin formation in plants, is essential for its transport (1038).

**Biochemical aspects:**—The amount of ribonucleic acid present in the plastids changes with the development of the plants (1009). Studies on ascorbic acid in plants and fruits do not support the view that its formation follows similar pathways in both plants and animals (1016, 1017). Analytical methods for studying organic compounds in fruits are described in two papers (1155, 1158).

## PLANT PROTECTION

**General:**—Fungi may enter plants at many points, but not, it would seem, through the stigma (1707). Stakes used for young trees and weeds around their collars may encourage attack by root-rotting fungi (1921). Growth substances may induce resistance to fungi (1569), sometimes by causing the pathogen to produce its own self-destroying antibiotic (1355). Further information is available on the toxins produced by fungi and insects (1308, 1915), and a case is noted in which an extract from a mealybug inhibited "germination" in sugar cane setts (1926). A sawdust mulch may sometimes have an indirectly beneficial effect by raising the soil temperature to a level that is lethal to a pest (1581). The sensitivity of trees to cyanide injury and borer attack may depend on the silica content of their bark (1867). Finally comes a bit of detective work, which suggests that the anti-malarial activities of the military may on one occasion have led entomologists up the coconut garden path (1885).

**Soil sickness and fumigation:**—Various aspects of the replant problem are examined in 4 papers (1252, 1253, 1300, 1825). In fumigation to destroy nematodes depth as well as surface placement should be considered (1314, 1576).

**Chemicals and their effects:**—A new seed disinfectant (1487) and methods of evaluating old ones (1059), new insecticides (1364, 1366), a symposium on acaricides (1360), studies on the absorption and translocation of antibiotics (1353, 1354, 1433), phytotoxicity problems (1469, 1506), damage to bees and beneficial arthropods (1356, 1361, 1362), and taste panels for detecting off-flavours (1439), these are but examples of the complexities facing anyone wishing to grow disease- and pest-free crops. Even when the crop is safely harvested there are new chemicals to be considered for the control of storage rots (1847–1849).

**Plant hits back:**—A gruesome tale of the unfortunate aphid entangled among the glandular hairs of the tomato plant (1578).

**Viruses:**—The transmission of a virus by a mite is recorded for the first time (1271). Once a plant is infected by a virus its auxin content may rise or fall (1567, 1631). Another case is recorded in which a virus can be eliminated by propagating tip cuttings (1719). Tannic acid and several plant extracts have been found to inhibit certain viruses (1547, 1635), but the same cannot be said of a whole range of growth substances, antibiotics and other chemicals tested against the strawberry yellows complex (1273).

**Smog:**—Represented this time by papers on fluorides (1241, 1566) and ozone-hexene (1780, 1793).

## PROPAGATION

**Mitotic instability:**—The idea that vegetatively propagated material is always an exact chip of the old block is not supported by the finding that mitotically unstable blackberry seedlings continue to show instability in progeny raised from cuttings (1189). In a rather similar way nucellar-seedling lines of mandarins may differ genetically from each other as well as non-genetically from their parent (1799). The development of mitotic irregularities in seeds during prolonged storage, previously reported for tobacco, is now recorded for peas (1474). The maintenance of colchicine-induced mixoploidy in lily-of-the-valley root tips is attributed to the action of several glycosides (1738).

**Seeds:**—It is suggested that amyloids act as reserve carbohydrates in seeds of many species (1053). Avocado seeds from immature fruits may give rise to albino seedlings (1794), and eggplant seeds from fruits that ripen inside coloured bags may germinate badly (1548). During the storage of carrot seeds the moisture content has more effect than temperature on viability (1511). Among seed treatments are pectic enzyme to separate the mucilaginous seed masses of cacti (1749), hot water to eliminate *Stemphylium* infection in carrot seeds (1517) and light and sodium hypochlorite to break dormancy in guayule seeds (1690).

**Stock-scion relations:**—Under some conditions eggplants yield much better when grafted on tomatoes than when grown on their own roots (1555, 1556). The effects of grafting on alkaloid distribution and conversion are described for grafts between different *Nicotiana* species (1625) and between tobacco and tomato (1593), and in this last case the seedlings of tomato scions are said to have contained some nicotine down to the $F_5$ generation. The apple variety Winter Banana can be grown on quince

rootstocks, given the use of certain interstocks (1109). Another intergeneric combination for which limited success is claimed is *Vitis* worked on *Tetrastigma* (1218).

## MISCELLANEOUS

**Back-ache cured:**—Garden peas successfully sod-seeded (1481).
**Defoliation and disbudding:**—Effects on flower bud differentiation and wood anatomy (1113, 1116, 1117).
**Muck but no magic:**—Vitamin contents of hydroponic- and soil-grown vegetables (1417).
**Plain English:**—Flower colours described in (1006).
**Up-side-down:**—Polarity in a tree reversed during a severe thunderstorm (1035).

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## MISCELLANEOUS.

### *General.*

(*See also* 1084l, n, 1085a, c, d, 1965, 1972, 1978-1983, 1985, 1987, 1988, 1994, 2002, 2003, 2008a, h-n, s-u.)

1004. ANON.
Una nueva realización del M.A.C. Las estaciones experimentales. (**A new achievement of the [Venezuelan] Ministry of Agriculture. Experimental stations.**)
*Agric. venezol.*, 1956, **21**(189): 4-5.

Three agricultural experimental stations have been established as follows: in the Guárico region as representing the plains; at Sanare for research at high altitudes; and at Maracay (the existing Centro de Investigaciones Agronómicas) for the intermediate zone.

1005. [GARTENBAU-NOMENKLATUR-AUSSCHUSS.]
Pflanzenbeschreibung im gärtnerischen Schrifttum. (**The description of plants in horticultural literature.**]
*Dtsch. Baumsch.*, 1956, **8**: 269-71.

The German Committee of Horticultural Nomenclature has collaborated with the Association of German Nurseries in drawing up a list of 36 symbols and many abbreviations to be used in the description of plants for horticultural purposes. Special emphasis is laid on abbreviations of terms in the nursery trade and on figures denoting the age of young plants, such as seedlings, cuttings, worked trees, layers, runners, etc.

1006. WANSCHER, J. H.
**Description of flower colours in ordinary language. With a colour chart founded on new principles.**
*Sci. Hort.*, 1956, **12**: 95-103, bibl. 5.

This chart and the account of it do not pretend to do away with the usefulness of the Horticultural Colour Chart issued by the Royal Horticultural Society, but they do make individual judgement easier. The simplified colour descriptions plus the chart [included here] are intended particularly for popular books and catalogues. The author justly suggests that it will be useful for horticultural students and amateurs and that it should function as a link between users of the H.C.C. and those who have not access to this work or want a simpler system. [See also *H.A.*, 26: 9.]

1007. TOMASELLI, E.
Relazione sulla nomenclatura botanica speleologica. (**A report on the nomenclature of cave flora.**)
*Atti Ist. bot. Univ. Pavia*, 1956, **12**: 203-21, bibl. 20.

The author discusses the possibility of classifying plants according to their speleological preferences and proposes for the purpose that caves shall be classified in zones in accordance with the biological response of plants to the ecological conditions found in such caves.

1008. STAŃCZAK-BORATYŃSKA, W.
Badania anatomiczne mykorhizy egzotycznych roślin Palmiarni Poznańskiej. (**Anatomical studies on mycorrhiza in exotic plants in the palm house at Poznan.**) [Russian and German summaries 4 pp. each.]
*Ann. Univ. M. Curie-Skłodowska, Sect. C*, 1954, **9**: 1-60, bibl. 10, illus.

The plants studied included *Cycas* sp., *Araucaria excelsa*, species of Araceae and Cyperaceae, *Bambusa* spp., *Dracaena* sp., *Cordyline* sp., *Yucca gloriosa*, Palmae including the date, *Jacobinia* spp., *Erica arborea*, Euphoriabeaceous species including *Ricinus*, *Cinnamomum burmanii*, two leguminous species, *Ficus* spp., *Eucalyptus globulus*, *Piper* spp., *Theophrasta longifolia* and *Vitis vinifera*. Mycorrhizae were present in only 13 species, and occurred mainly in plants which had been raised from seed. Mycotrophically living plants absorbed 2 to 4 times as much water from the substrate as did autotrophic plants.

1009. SISAKJAN, N. M., AND ODINCOVA, M. S.
**The ribonucleic acid of the plastids and its changes during development of the organism.**
[Russian, with English summary ½ p.]
*Biohimija*, 1956, **21**: 577-84, bibl. 15.

The chloroplasts of the leaves of sugar beet, spinach, clover, sunflower and tobacco and the chromaplasts of carrots contained from 0·5 to 3·5% ribonucleic acid (on a dry weight basis) depending on the nature, age and physiological condition of the plant. The chloroplasts of young leaves contained 2–3 times more of the acid than those of older leaves. The normal distribution of the acid in the plastids was changed during flowering, owing, presumably, to transport of the material to the flowers. With the decrease in the ribonucleic acid content in the chloroplasts of the developing organism there occurred a rise in the ribonuclease activity. With an increase in the nucleic acid phosphorus there occurred a decrease in the acid soluble phosphorus, which acts, apparently, as a source of phosphorus for the biosynthesis of ribonucleic acid. —Bah Inst. of Biochem., Moscow.

1010. CARPENTIER, L. J.
**Report on the papers on the use of radioactive isotopes in agricultural research.**
*Bull. Docum.*, 1956, No. 20, pp. 73-80, bibl. 14.

The author of this paper discusses briefly those papers given at the International Conference of the United Nations on the "Peaceful uses of atomic energy", Geneva 1955, which deal with problems related to (1) the general use of radio-isotopes in agriculture (a) radioactive elements in plant physiology and (b) radioactive elements and the study of the soil, and (2) the use of fertilizers (a) foliar application, (b) the role of $P^{32}$ in agricultural research and (c) the method of applying phosphate fertilizer. He regrets as regards radio-isotopes the overwhelming attention paid to $P^{32}$. He notes that the use of $P^{32}$ has led to the explanation of certain complex phenomena such as phosphoric acid fixation, and he considers that other elements might well benefit from similar research.

1011. DEXTER, S. T.
**The evaluation of crop plants for winter hardiness.**
*Advanc. Agron.*, 1956, **8**: 203-39, bibl. 63.

The main body of discussion is devoted to methods of testing plants for winter hardiness. The author ends his review with the challenging remark that some of the fundamental findings of recent years still await application by agronomists and horticulturists.

### *Economics.*

(*See also* 1084v, 1110.)

1012. ALLEN, G. R.
**Short-term production variations for horticultural products and the marketing system.**
*Fm Econ., Oxf.*, 1956, **8**(6): 1-27, bibl. 15.

The author examines the year-to-year variations in the output of British horticulture since 1920, and discusses possible techniques, operated through marketing systems, for reducing fluctuations in acreages and prices. In an appendix an analysis of the statistical relationships between prices and production for several vegetable crops shows that, in general, the prices ruling in one year have little effect on the acreage planted in the following year. This indicates that a guaranteed price system could not be worked for most of these crops in a way which would prevent year-to-year acreage fluctuations.

### *Statistical design.*

(*See also* 1084w, 1088, 1439.)

1013. FINNEY, D. J., AND COPE, F. W.
**The statistical analysis of a complex experiment involving unintentional constraints.**
*Biometrics*, 1956, **12**: 345-68, bibl. 7.

A factorial experiment on cacao now in progress in Trinidad presents several interesting features as an example of the design and analysis of field experiments. Originally conceived as a plaid square for $2^3 \times 4$ set of treatments, circumstances forced a change to partial confounding in randomized blocks for a $2 \times 4^2$ set. The change was made after certain factors had been introduced, and therefore some constraints from the earlier design remained. Yields from the experiment in 1954–55 are used in an illustration of the systematic analysis and summarizing needed for the partially confounded design, neglecting the additional constraints. The construction of tables of mean yields and the calculation of standard errors appropriate to various comparisons are emphasized. A multiple regression technique is then used in order to take account of the other constraints. [Authors' summary.] —Univ. Aberdeen and Imp. Coll. trop. Agric., Trinidad.

### *Biochemistry.*

(*See also* 1084h, i, k, z, 1085b.)

1014. COHEN, M., AND OTHERS.
**Solubility and color characteristics of leaf proteins prepared in air or nitrogen.**
*Science*, 1956, **124**: 1081-2, bib. 3, illus.

The authors describe a method of preparing an anaerobic tobacco leaf extract free of cell walls, nuclei, chloroplasts, mitochondria and sphaerosomes, and compare the remaining soluble proteins with a similar aerobic preparation. The protoplasmic constituents prepared by the anaerobic method appeared to correspond more closely with those in the living cell.—Univ. Calif., Los Angeles.

1015. MURNEEK, A. E.
Le vitamine nelle piante. **(Vitamins in plants.)**
*Nuovo G. bot. ital.*, 1953, **60**: 343-50 [received 1957].

A review of vitamins in plants and soil, including: contents of the various B vitamins in beet, spinach, carrot, cabbage, apple and tomato; distribution of 4 of these (thiamine, pyridoxine, riboflavine and pantothenic acid) in the tomato plant; synthesis of vitamins B and C in germinating seeds of bean and pea.

1016. LOEWUS, F. A., JANG, R., AND SEEGMILLER, C. G.
**The conversion of $C^{14}$-labeled sugars to L-ascorbic acid in ripening strawberries.**
*J. biol. Chem.*, 1956, **222**: 649-64, bibl. 24.

Detached ripening strawberries were injected with or stem-fed glucose-1-$C^{14}$, glucose-2-$C^{14}$, galactose-1-$C^{14}$, sodium glucuronate-6-$C^{14}$, or glucuronolactone-6-$C^{14}$. The ascorbic acid was recovered and degraded to determine the activities of the constituent carbon atoms. Ascorbic acid from glucose-1-$C^{14}$-labeled berries contained 65 to 70% of its activity in C-1, 14 to 19% in C-6, and 7 to 18% in C-3. The nature of this labeling pattern was confirmed with glucose-2-$C^{14}$-labeled berries. In a single experiment, the ascorbic acid from a galactose-1-$C^{14}$-labeled berry contained approximately the same activities in carbons 1 and 6. Sodium glucuronate-6-$C^{14}$ and glucuronolactone-6-$C^{14}$ did not furnish significant amounts of $C^{14}$ for ascorbic acid synthesis. [Authors' summary.]—West. Utiliz. Res. Br., U.S.D.A., Albany, Calif.

1017. LOEWUS, F. A., AND JANG, R.
**Further studies on the formation of ascorbic acid in plants.**
*Biochim. biophys. Acta*, 1957, **23**: 205-6, bibl. 9.

The results of experiments in which cress seedlings were fed with D-glucose-1-$C^{14}$, taken in conjunction with

results previously presented for ripening strawberries [[see preceding abstract], do not support the view that ascorbic acid formation follows similar pathways in both plants and animals. Further studies on the processes occurring in plants are in progress.—West Utiliz. Res. Br., U.S.D.A., Albany, Calif.

1018. Isherwood, F. A., and Niavis, C. A.
**Estimation of α-keto acids in plant tissue: a critical study of various methods of extraction as applied to strawberry leaves, washed potato slices and peas.**
*Biochem. J.*, 1956, **64**: 549-58, bibl. 9.
Various methods of inactivating the enzymes in strawberry leaves and peas were critically compared as a preliminary to estimating the α-keto acids by the chromatographic method of Isherwood and Cruickshank. In the recommended method, the tissue was frozen in a mixture of methanol and solid carbon dioxide and then disintegrated in 0·6 M metaphosphoric acid at −2°. The principle of this procedure, that it is best to arrest the activity of the enzymes by cooling to a low temperature and inactivate them by chemical treatment while they are still in this arrested state, is important in the estimation of other labile intermediates such as phosphoric esters. [From authors' summary.]

1019. Tokarskaja (Merenova), V. I., and Kuzin, A. M.
**Metabolism of acetate-1-$C^{14}$ taken up by the root system of plants.** [Russian, with English summary 11 lines.]
*Biohimija*, 1956, **21**: 816-25, bibl. 32, illus.
A study was made of the acetate-1-$C^{14}$ uptake by the root system of haricot beans in light and darkness. Transport of acetate from the roots to the leaves proceeded at a higher rate in light than in darkness. In light 12% of absorbed $C^{14}$ was incorporated into various organic compounds, while in darkness 40% was detected in the released $CO_2$, only 4% being assimilated by the plant. $C^{14}$ from acetate was incorporated first of all in all acids of the Krebs cycle and in free amino acids, of which dicarbonic acids and their amides were appreciably radioactive. A considerable amount of $C^{14}$ was incorporated into proteins in the form of glutamic acid. Radioactivity of fatty acids amounted to 7%. Soluble sugars (glucose and fructose) showed about 3% radioactivity.—[From authors' English summary.]

1020. Walker, L. C.
**Leaf analysis: a potential forestry tool.**
*Bett. Crops*, 1956, **40**(10): 25-6, 42-3, bibl. 3, illus.
An outline is given of a survey of native plants of the Adirondack Mountains of New York State to determine the extent to which leaf symptoms and leaf analyses could be used as guides to K deficiency in the soils of the area. Critical levels of leaf K, which reflected the soil K status of the plough zone, were established for a number of species, including *Fragaria virginiana* (0·9% K in July and August) and the choke cherry, *Prunus virginiana* (0·7% K in July and 0·6% in August). Bright red leaf margins in the black cherry, *Prunus serotina*, and browning between the veins of blackberry (*Rubus* spp.) leaves were both associated with leaf K levels of less than 0·8%.

1021. Harborne, J. B.
**Variations in the glycosidic pattern of anthocyanins.**
*Nature*, 1957, **179**: 429, bibl. 6.
Some unusual anthocyanidin glycosides are discussed which are present in red tubers of cultivated diploid potatoes, in stems and leaves of *Streptocarpus* species and hybrids and in the berries of the elder, *Sambucus nigra*.—John Innes hort. Instn, Herts.

1022. Miller, G. W., and Evans, H. J.
**The influence of salts on the activity of particulate cytochrome oxidase from roots of higher plants.**
*Plant Physiol.*, 1956, **31**: 357-64, bibl. 23.
Preparations from tobacco and spinach roots were included in the study. The effects of increasing concentrations of chlorides of Na, K, Ca and Mg on cytochrome oxidase activity are compared.—North Carolina St. Coll., Raleigh.

## *Physiology.*

(*See also* 1084e, f, 1085i, 1211, 1624.)

1023. Sironval, C.
**Action of day-length upon the formation of adventitious buds in *Bryophyllum tubiflorum* Harv.**
*Nature*, 1956, **178**: 1357-8, illus.
After 4 months' culture young *Bryophyllum tubiflorum* plants grown in an 8-hour-day differed from similar plants grown in a 16-hour-day in that they were smaller and in that the leaves produced no adventitious buds, while the leaves of long-day plants had produced a great number of such buds. All the leaves were then removed from the 8-hour and the 16-hour plants and placed horizontally in a moistened sand surface. Both series of leaves were subjected to both short- and long-day treatments so that, in all, 4 series were formed. Initially, only the long-day leaves produced new adventitious buds which were normally situated at the apical end. After one month, however, the short-day leaves began to develop a certain number of young buds at their basal end, where the long-day leaves had initiated very few buds after several months. Day-length was thus shown to have a profound influence on the polarity of *B. tubiflorum* leaves with regard to adventitious bud formation, but only if given to the mother plant before the cutting of the leaves.—Univ. Liège.

1024. Lona, F.
La reazione fotoperiodica con speciale riguardo ai processi biochimici della fotofase. 1. I processi euflorigeni. (**The photoperiodic reaction, with special reference to biochemical processes of the photophase. 1. Flower-inducing processes.**) [English summary ¾ p.]
*Nuovo G. bot. ital.*, 1953 [issued 1954], **60**: 851-7, bibl. 11.
Seedlings of *Chenopodium amaranticolor* flowered within one month when kept in darkness for 23 hours daily and supplied *via* their roots with 2·5% cane-sugar solution. Similar seedlings without sugar produced no flowers whether their day length was 1 or 18 hours. Those with sugar and long-day treatment also remained

vegetative. With 10 hours of dim light and 14 of darkness daily, flowering occurred only in the sugar-fed plants.

1025. Šmatok, I. D.
**The effect of day length under polar conditions on the carbohydrate and mineral content of *Caragana arborescens* and *Syringa vulgaris*.** [Russian.]
*Doklady Akad. Nauk S.S.S.R.*, 1956, **111**: 213-16, bibl. 9, illus.

A comparison was made between the carbohydrate and mineral contents of caragana and lilac grown in 10- and 14-hour day lengths and in natural polar day length. In both plants the carbohydrate content of the leaves was lower and the soluble carbohydrate content of the stems and roots was higher in short photoperiods than in long polar days. Data on carbohydrates together with total dry matter and N, P, K, and Ca contents are tabulated.

1026. Evans, L. T.
**Chasmogamous flowering in *Viola palustris* L.**
*Nature*, 1956, **178**: 1301, bibl. 4.

Experimental results obtained at the Earhart Laboratory, Pasadena, show that "the effect of vernalization and short-day treatments on the induction of chasmogamous flowering in *V. palustris* is strikingly ephemeral, few of the buds present during these treatments giving rise to chasmogamous flowers, which does suggest that the specific effects of short days and low temperatures on full flower development may be expressed only within a narrow range of growth conditions".

1027. Böhning, R. H., and Burnside, C. A.
**The effect of light intensity on rate of apparent photosynthesis in leaves of sun and shade plants.**
*Amer. J. Bot.*, 1956, **43**: 557-61, bibl. 4.

Light saturation curves for apparent photosynthesis of 8 sun species [bean, tomato, sunflower, tobacco, soyabean, castor bean, cotton and coleus] and 5 shade species [oxalis, *Dryopteris*, *Nephrolepis*, saintpaulia and *Philodendron cordatum*] are presented. Light saturation and compensation points for the sun species were 2,000–2,500 ft. c. and 100–150 ft. c. respectively. For the shade species light saturation was reached at a maximum of 1,000 ft. c. and in some shade species light saturation intensities as low as 400–500 ft. c. were noted. The compensation point of the shade species was approximately 50 ft. c. [From authors' summary.] Ohio St. Univ., Columbus.

1028. Ashby, E.
**A procession of flowers.**
*Proc. roy. Instn G.B.*, 1956, **36**: 42-56, illus.

A fascinating study of how a botanist ferrets out the truth about plant growth, always searching, always being confronted with some strange phenomenon that upsets or confirms part of his theory but inevitably raises other equally interesting, not always side, issues. In this instance the author is concerned primarily with the effect of light on plant growth, the why and wherefore, how much, how long, etc., etc. "There is no journey's end," he concludes, but that does not detract from the interest of the journey.

1029. Butterfield, N. W.
**Factors affecting the metabolism of greenhouse plants with special reference to *Chrysanthemum morifolium*.**
*Diss. Abstr.*, 1956, **16**: 840, being *Publ.* 16,454 of 137 pp.

An infra-red gas analyser was used to detect small quantities of carbon dioxide. Chrysanthemum and *Xanthium* plants when induced photoperiodically showed no apparent net fixation of $CO_2$. Two chrysanthemum varieties, Indianapolis Pink and Bluechips, showed an increase in respiration rate when induced, especially with the third and fourth inductions. Whole *Xanthium* plants with 4 leaves, single attached leaves and young excised leaves showed increased rates of respiration when induced. Fairly matured leaves when induced were found to have a decreased rate of respiration. Wilting chrysanthemum plants showed an initial increased rate of photosynthesis. At the stage of temporary wilting the rate of photosynthesis was greatly reduced, and did not return to normal within the study period even after the addition of water. *Bryophyllum* plants showed marked ability for carbon dioxide fixation during the night.—Purdue Univ.

1030. Cappelletti, C.
Ricerche sulle variazioni giornaliere dell' acqua nelle piante alpine in relazione alla quota ed alla stazione. **(Studies on daily variation of water content of alpine plants in relation to altitude and locality.)** [English summary ½ p.]
*Nuovo G. bot. ital.*, 1953, **60**: 351-433, bibl. 44 [received 1957].

Herbaceous plants, shrubs and trees growing between 1,000 and 2,300 m. were included in morning and evening recordings of imbibition index (water content as percentage of dry weight) and succulence index (content per 100 cm.² of leaf surface). In general the greater the altitude and the more exposed the position, the greater was the variation in these indices. In sheltered localities with little or no dew, variations tended to be opposite to those in exposed positions. In general succulence increased with altitude. The plants studied include *Aconitum* spp., *Arnica montana*, *Daphne mezereum*, *Helleborus niger*, lily of the valley, *Lonicera* spp., *Picea excelsa*, *Pinus cembra*, *P. sylvestris*, *Populus tremula*, raspberry, *Rhododendron hirsutum*, *Rosa pendulina*, *Salix* spp., *Sorbus aucuparia*, strawberry, *Vaccinium* spp., and *Veratrum album*.

1031. Beevers, H.
**Intermediates of the pentose phosphate pathway as respiratory substrates.**
*Plant Physiol.*, 1956, **31**: 339-47, bibl. 15.

Data are included for tissue slices of pea and carrot from experiments on aerobic and anaerobic respiration with pentoses, gluconates and sedoheptulose as substrates.—Purdue Univ., Lafayette, Ind., and Brookhaven nat. Lab., Upton, N.Y.

1032. Terpstra, W.
**Some factors influencing the abscission of debladed leaf petioles.**
Reprinted from *Acta bot. neerl.*, 1956, **5**: 157-70, bibl. 22, illus.

In experiments with *Coleus* the growing shoot tip was

found to accelerate the fall of debladed petioles. Axillary buds had a negligible effect until the growing tip was removed. Applications of IAA replaced the effect of the growing tip. In 8-year-old James Grieve trees a similar effect was produced by the growing tip. Root removal from *Coleus* caused an initial acceleration of petiole fall. With *Coleus* and apple plants in a horizontal position petiole fall was markedly accelerated in comparison with upright plants. The results are discussed in relation to practical fruit-growing.—Inst. hort. Pl. Breed., Wageningen.

### *Environment.*

(*See also* 1241.)

1033. Selman, I. W., and Foster, J. C.
**The Wye College plant growth rooms.**
*J. hort. Sci.*, 1957, **32**: 49-52, bibl. 1, illus.

The constructional details and performance are given for three growth rooms each designed to accommodate 60–80 plants in 3-in. pots. Illumination is by 20 "New Warm White" 80-watt fluorescent tubes arranged above a plate-glass ceiling panel. With the lights on, temperature control may be obtained at any level between 35° F. and 90° F. and different day and night temperatures may be provided, with a time lag of up to 2 hours for a drop of 20° from day to night levels. [Authors' summary.]

1034. Hudson, J. P.
**Control of plant environment for experimental work and notes on environmental control equipment in use in Britain.**
*Misc. Publ. Univ. Nottingham Dep. Hort.* **8**, 1957, pp. 30, bibl. 58, 3s. 6d. post free.

The environmental factors with which this useful compilation is concerned are air temperature, light (intensity, quality and duration), relative humidity of the air, composition of the atmosphere (including air pollutants), air speed and soil temperature. The principles underlying the control of environment and the need for flexibility in planning such control are discussed briefly. Types of controlled environment are classified and described as follows : bench apparatus, growth cabinets, temperature-controlled rooms, growth rooms, glasshouses and phytotrons. In addition notes are provided on the use of glasshouses for work on photoperiodic responses and of partial shelters for plants grown in the open. Of particular value are the concise details supplied on the many installations at present in use in Britain in university departments of agriculture, botany, horticulture and zoology and in national and industrial research organizations. Finally, attention is drawn to the bibliography which provides references to papers of general interest as well as to papers specifically referred to in the text.

### *Lightning.*

1035. Burr, H. S.
**Effect of a severe storm on electric properties of a tree and the earth.**
*Science*, 1956, **124**: 1204-5.

In order to study the possible relationship between the electric environment of a tree, as measured by earth potentials, and the potentials of the tree itself, continuous and simultaneous records were taken during the summer of 1956. During a severe storm a reversed polarity developed in the earth and this was paralleled by a similar change in the tree, though beginning somewhat sooner and taking a little longer to develop. The studies are being continued.—Yale Univ. Sch. Medicine, New Haven, Conn.

1036. Spence, M. T.
**Damage to crops by lightning.**
*Agriculture, Lond.*, 1956, **63**: 387-9, bibl. 2, illus.

Lightning damage to brussels sprouts plants in Bedfordshire and tomato plants in a glasshouse in Norfolk is described. Damaged areas in the fields of sprouts were circular and between 15 and 35 yd. across. One or more leaves of the plants were partly or wholly scorched, the leaf stalks were often withered, and where these joined the stem most of the "pith" had been destroyed and the cortex split; the plants had sometimes bent over. The roots appeared to be unaffected. The author discusses reports in the literature of lightning damage in the U.S.A.—Meteor. Off., N.A.A.S., Cambridge. J.R.L.

### *Growth substances.*

(*See also* 1084t, 1129-34, 1159, 1233, Weeds and weed control section, 1421, 1422, 1426, 1444, 1462, 1480, 1551, 1557, 1569, 1631, 1675, 1718, 1756, 1770, 1879.)

1037. Zwar, J. A., and Rijven, A. H. G. C.
**Inhibition of transport of indole-3-acetic acid in the etiolated hypocotyl of *Phaseolus vulgaris* L.**
*Aust. J. biol. Sci.*, 1956, **9**: 528-38, bibl. 8.

Pre-treatment of hypocotyl segments with 2,4-dichlorophenoxyacetic acid, 2,4-dichlorophenoxypropionic acid, 2,4-dichlorophenoxybutyric acid, 2,4,6-trichlorophenoxyacetic acid, indole-3-propionic acid or 2,3,5-triiodobenzoic acid decreased basipetal transport of IAA. Pre-treatment with *p*-chlorophenoxy*iso*butyric acid, 2,4-dichloroanisole, coumarin, o-*iso*propyl-*N*-phenylcarbamate, indole, indole-3-acetonitrile, or phenylacetic acid was without effect. It is suggested that the inhibiting growth substances compete for sites on hypothetical carriers of IAA.—C.S.I.R.O., Canberra.

1038. v. Guttenberg, H., and Zetsche, K.
Der Einfluss des Lichtes auf die Auxinbildung und den Auxintransport. **(The effect of light on auxin formation and auxin transport.)**
*Planta*, 1956, **48**: 99-134, bibl. 61.

Auxin formation and transport was studied in *Helianthus annuus*, tomato, tobacco and white cabbage. Darkened plants of *Helianthus*, tomato and tobacco showed increasing auxin content with increasing dark period. Plants kept in light contained little or no ether-soluble auxin. Cabbage plants in light had high auxin contents, which were not further increased in darkness. It is suggested that light is necessary not for auxin formation but for its transport. Tissue cylinders from *Helianthus* which were kept in light showed normal transport of IAA; cylinders from darkened plants transported little or no IAA. Transport of IAA in *Helianthus* cylinders from plants in the light was reduced in a $CO_2$ atmosphere. There was little or no

IAA transport in cylinders from darkened plants. In cylinders from darkened plants given extra carbohydrate, however, much IAA was transported basipetally. Photoinactivation of auxin formed in darkened plants did not occur. An increase in auxin content was also observed in rootless plants in the dark. Rootless plants in light had a high auxin content comparable to that of darkened intact plants.—Univ. Rostok.

1039. HESLOP-HARRISON, J.
**The experimental modification of sex expression in flowering plants.**
*Biol. Rev.*, 1957, **32**: 38-90, bibl. 188.
A review covering the effects of mineral nutrition, light, temperature, mutilation, grafting, animal sex hormones and plant growth-stimulating and growth-suppressing substances.—Dep. Bot., Queen's Univ., Belfast.

1040. CHING, T.-M. T., HAMILTON, R. H., AND BANDURSKI, R. S.
**Selective inhibition of the geotropic response by *n*-1-naphthylphthalamic acid.**
*Physiol. Plant.*, 1956, **9**: 546-58, bibl. 13.
Over the time interval for geotropic bending to reach a maximum, a direct correlation exists between the rate of straight growth and geotropic curvature in untreated Avena coleoptiles and the young roots and shoots of corn and pea. A disproportional inhibition of growth and curvature was found in *n*-1-naphthylphthalamic acid (NP) treated roots and shoots of corn and pea, but no disproportionality was observed in NP treated Avena coleoptiles. Corn roots treated with 2,4-dichlorophenoxyisobutyric acid showed a proportional inhibition of straight growth and geotropic curvature. The close correlation between straight growth and geotropic curvature to be expected on the basis of the Went-Cholodny theory was not obtained. [Authors' summary.]—Mich. St. Univ., East Lansing.

1041. SINHA, S. K.
**Vascular pattern of the hormone-induced roots of isolated dicot leaves.**
*Sci. and Cult.*, 1956, **21**: 741, bibl. 5.
Anatomical studies were carried out on roots induced by hormones on leaves of 6 dicotyledons. When the stelar pattern of normal roots was fairly simple, that of the hormone-induced roots was relatively complex; the reverse was also found to be true in some cases.—Ravenshaw Coll., Cuttack.

1042. HACCIUS, B., AND NIES, H.
Über die Wirkung von 2,3,5-Trijodbenzoesäure und von 2,4,6-Trichlorphenoxyessigsäure auf die Abgliederung entspreiteter Blattstiele. **(The effect of 2,3,5-triiodobenzoic acid and 2,4,6-trichlorophenoxyacetic acid on the abscission of defoliated petioles.)**
*Planta*, 1956, **47**: 613-24, bibl. 36, illus.
Defoliated petioles of *Ruellia devosiana*, *R. strepens* and *Impatiens marianae* were treated with several concentrations of TIBA and 2,4,6-T. Both substances above a certain concentration accelerated abscission, while lower concentrations inhibited it. The critical level depended on plant species and time of year.—Bot. Inst., Univ. Mainz.

1043. ASHIZAWA, M., AND AKI, S.
**Studies with 2,4-D treatments on growth of young fruit trees. II. Physiological and morphological observations on abnormal roots induced by soil treatments with 2,4-D solutions.** [Japanese, with English summary ¼ p.]
*Tech. Bull. Kagawa agric. Coll.*, 1956, **7**: 123-34, bibl. 35, illus.
The soil was watered with solutions of 2,4-D and it was found that optimum growth of grape vines (Campbell's Early) occurred with 10 p.p.m., of tomatoes with 4 p.p.m. and of coleus with 15 p.p.m. Concentrations above these caused a check to growth. The cells of the roots of plants treated with weak solutions of 2,4-D were similar to those of untreated plants, but with stronger solutions cell division became more active, the arrangement of the vascular bundles irregular, cortical and pith tissues became enlarged and the xylem did not develop normally. J.R.L.

1044. TOOTHILL, J., WAIN, R. L., AND WIGHTMAN, F.
**Studies on plant growth-regulating substances. X. The activity of some 2:6- and 3:5-substituted phenoxyalkanecarboxylic acids.**
*Ann. appl. Biol.*, 1956, **44**: 547-60, bibl. 56, illus.
A study has been made of the growth-regulating activity of a number of phenoxy acids possessing halogen or methyl substituents in the 2:6- or 3:5-positions of the nucleus. The pea curvature, *Avena* cylinder elongation and tomato-leaf epinasty tests have been used for assessing biological activity. The results show that in general 3:5- is more closely associated with inactivity than 2:6-substitution. The introduction of a further halogen atom into the 4-position does not enhance activity in the 2:6- compounds but does so in the 3:5- derivatives. Although the 2:4:6-trichloro- and 2:4:6-tribromo-phenoxyacetic acids are almost inactive, 2:4-dichloro-6-fluoro- and 2:4-dibromo-6-fluoro-phenoxyacetic acids are very highly active. When a methyl group is substituted into the side-chain of certain phenoxyacetic acids possessing 2:6- substituents, growth-promoting activity is increased. Some of these findings conflict with recent theories on mode of action of phenoxy acids which are discussed in relation to the present work. [Authors' abstract.]—Wye Coll., Univ. Lond. [For parts VIII and IX see *H.A.*, 26: 51 and 836.]

1045. RAPPAPORT, L.
**Growth regulating metabolites.**
*Calif. Agric.*, 1956, **10**(12): 4, 11, illus.
It is mentioned that extracts from young bean seeds have yielded fractions indistinguishable from known gibberellins, which suggests that these compounds occur naturally in some higher plants. Several plant responses to gibberellins are recorded briefly. Gibberellin stimulated flowering in the first year in the biennial *Hyoscyamus niger* under conditions of warmth and long photoperiods, but repeated spray applications at 500 p.p.m. Ga (a mixture of gibberellin A and gibberellic acid) failed to promote flowering in onions. With tomatoes Ga at several concentrations caused a rapid increase in stem elongation, a change in leaf shape,

earlier flowering and increased fruit set and parthenocarpy.

1046. Brian, P. W., and Hemming, H. G.
**A relation between the effects of gibberellic acid and indolylacetic acid on plant cell extension.**
*Nature*, 1957, **179**: 417, bibl. 5.
Gibberellic acid was shown to depend on indoleacetic acid for its effect on the elongation of pea internode sections. Though gibberellic acid alone did not significantly increase extension in light of such sections from pea plants grown in light, it did induce elongation in darkness of sections from etiolated plants.—Akers Res. Labs, I.C.I., Welwyn, Herts. [For earlier work see *H.A.*, 26: 609.]

1047. Bukovac, M. J., and Wittwer, S. H.
**Gibberellic acid and higher plants: I. General growth responses.**
*Quart. Bull. Mich. agric. Exp. Stat.*, 1956, **39**: 307-20, bibl. 18, illus.
Gibberellic acid or gibberellin (10–20 μg. per plant) was applied to the growing point or leaf surface of pea, bean, tomato, celery, capsicum, sweet corn, squash, cucumber, lettuce and cabbage grown in nutrient solutions or soil in the greenhouse. The universal response was marked elongation of internodes. Dwarf peas grew taller than normally tall types. Bush beans were changed to twining forms, and seedlings of the Blue Lake variety responded to gibberellin concentrations of 0·01–100 μg. per plant by progressively increased epicotyl growth, their sensitivity being useful for bioassay of gibberellic preparations. The growth-inhibiting action of maleic hydrazide was counteracted by gibberellic acid. Besides increasing in linear growth, celery responded by a very significant increase in dry weight of tops, and some tomato varieties showed a similar, but less marked response. Cabbage and lettuce responded by rapid elongation of internodes without head formation, capsicums grew to double or treble their normal height, and squash and cucumber plants increased in both normal height and leaf size.

1048. Lona, F.
Effetti citologici della podofillina su apici radicali di *Allium cepa*. (**Cytological effects of podophyllin on root apices of *Allium cepa*.**) [English summary 8 lines.]
*Nuovo G. bot. ital.*, 1953, **60**: 341-2, bibl. 1 [received 1957].
Resin from *Podophyllum peltatum* as 1% or 0·1% aqueous suspensions and also at greater dilution induced onion root apices to swell within a few hours. At higher concentrations it induced a reversible cessation of growth. Mitosis was retarded or arrested at metaphase, or in dilute solutions it proceeded to an irregular anaphase.

1049. Čajlahjan, M. H.
**The effect of vitamins on the growth and development of plants.** [Russian.]
*Doklady Akad. Nauk S.S.S.R.*, 1956, **111**: 894-7, bibl. 18, illus.
In 3 years' experiments vitamins C (ascorbic acid), $B_1$ (thiamin) and PP (nicotinic acid), and potassium permanganate, boric acid and thiourea were applied repeatedly to plants by vacuum-infiltration or spraying. Ascorbic acid accelerated bud initiation and flowering in *Rudbeckia bicolor*, soya bean and *Perilla nankinensis* and improved the growth of rudbeckia. Thiamin accelerated flowering in perilla and maize, and nicotinic acid that in soya bean, perilla, maize and wheat and stimulated the growth of wheat. The effect of the other compounds was similar to that of vitamins.

### *Tissue culture.*

1050. Turel, F. L. M., and Howes, M. M.
**Safflower leaf tissue cultures.**
*Canad. J. Bot.*, 1956, **34**: 825-9, bibl. 8, illus.
A tissue culture was obtained from the cells around the vein of a piece of normal safflower leaf. The tissue has now been transferred monthly for two and one-half years. Growth was measured on White's, Knop's and Heller's media with and without 0·1 mgm. indole-3-acetic acid per litre and/or 10% coconut milk. Indole-3-acetic acid had no effect but coconut milk greatly enhanced growth. Heller's medium plus coconut milk was the best for growth of the leaf tissue. The addition of coconut milk to White's medium caused a decrease in percentage of dry weight of the leaf tissue culture, whereas its addition to Heller's medium had no such effect. [Authors' abstract.]—Prairie reg. Lab., Saskatoon, Sask.

1051. Doerpinghaus, S. L.
**Studies on the effect of RNA and xanthine on roots of inbred and hybrid tomatoes *in vitro*.**
*Diss. Abstr.*, 1956, **16**: 1567, being *Publ.* 17,438 of 59 pp.
The growth of excised tomato roots from several strains was studied in media containing various nucleic materials. Inhibitory and stimulatory effects distinctive to the strains were only observed in RNA (ribose nucleic acid) and xanthine media.—Louisiana St. Univ.

1052. Rijven, A. H. G. C.
**Glutamine and asparagine as nitrogen sources for the growth of plant embryos *in vitro*: a comparative study of 12 species.**
*Aust. J. biol. Sci.*, 1956, **9**: 511-27, bibl. 10.
In all cases glutamine stimulated growth more than asparagine. In some cases asparagine inhibited growth at high concentrations.—C.S.I.R.O., Canberra.

### *Seeds and seed treatment.*

(*See also* 1084o, 1085h, 1104, 1105, 1486-90, 1509-11, 1513, 1517, 1520, 1527, 1529, 1536-1538, 1548.)

1053. Kooiman, P.
**Amyloids of plant seeds.**
*Nature*, 1957, **179**: 107-9, bibl. 6, illus.
About 2,500 species of seed were tested for amyloid occurrence by their reaction to a solution of iodine in potassium iodide. In Caesalpiniaceae there was an indication that amyloid occurrence was characteristic for 2 tribes of the family. In other plant families studied amyloid occurred universally or occasionally. It is suggested that the amyloids are a group of chemically related substances acting, in most seeds, as reserve carbohydrates. In *Tropaeolum* seed it is pos-

sible that amyloid is stable only during the resting period.—Tech. Univ., Delft.

1054. Pohjola, K.
Über den Einfluss einiger Alkohole auf die Keimung der Samen. **(The effect of certain alcohols on seed germination.)**
*Arch. Soc. "Vanamo"*, 1956, **11**: 87-96, bibl. 9.

Seed of *Lepidium sativum* was treated with various compounds. Treatment with ethyl- and propyl-alcohol caused a quickening in rate of germination and increased strength of seedling growth. In all cases alcohol treatment led to quicker root growth but initially to decreased growth of hypocotyl. There was no indication that the alcohol released any growth-promoting substance.

1055. Bocchi, A.
Azione dell'eosina e dell'acido β-indol-acetico sulla forza germinativa e sull'allungamento delle radici primarie dei semi di alcune leguminose. **(Action of eosin and β-indoleacetic acid on the germinating power and elongation of primary roots of the seeds of some leguminous plants.)** [English summary ¼ p.]
*Nuovo G. bot. ital.*, 1953, **60**: 336-41, bibl. 2 [received 1957].

Treatment with β-indoleacetic acid, even at very low concentrations, delayed germination for 24 hours in broad bean, pea and white lupin. Eosin stimulated germination slightly at concentrations below 10 p.p.m. and markedly at 10–14·2 p.p.m., and distinctly retarded it at 100 p.p.m. Effects of both substances on root elongation were very similar to those on germination.

1056. Büttner, G.
Die Vorbehandlung von Saatgut mit Wärme und Feuchtigkeit. **(The pre-treatment of seed with heat and moisture.)**
*Dtsch. Gartenb.*, 1956, **3**: 294-5, bibl. 8.

(1) *Cucumber seed.* Forty-eight hours' exposure to 35° C. in the incubator, followed by the uptake of tap water from filter paper at room temperature for 24 hours and by renewed heat treatment at 35° C. for 24 hours, raised the percentage germination from 37 to 81 and advanced flowering by about 8 days. (2) *Tomato seed.* Forty-eight hours' treatment in the incubator, followed by 72 hours' soaking and 24 hours. drying at 35° C. raised the percentage of plants ready to be pricked out on the 29th day from 45 to 70. Cropping was advanced by 6 days. (3) *Castor bean seed.* The same treatment as given to tomato raised the germination percentage from 26·2 to 57·2 and greatly reduced wilting of seedlings caused by *Pseudomonas solanacearum.* Yields were increased by 12–14%.—Other observations showed that temperature and moisture conditions after sowing have a marked influence on the effect of the seed treatment.—Inst. Gartenb., Dresden-Pillnitz.

1057. Cavazza, L.
Considerazioni sull'impiego dell'acido solforico nel trattamento dei semi duri. **(Considerations on the use of sulphuric acid for treatment of hard seeds.)** [English summary 5 lines.]
*Nuovo G. bot. ital.*, 1953, **60**: 750-9, bibl. 10 [received 1957].

Seeds of *Gleditschia triacanthos* were rapidly rendered capable of germination by immersion at 25° C. for 2–4 hours in concentrated or 66⅔% sulphuric acid, or for 15 hours in this acid at 33⅓% concentration. Tables and graphs show the effects of concentration, temperature and time of immersion. Data are also presented for seeds of carob and of 3 leguminous pasture plants.

1058. Barton, L. V., and MacNab, J.
**Relation of different gases to the soaking injury of seeds. III. Some chemical aspects.**
*Contr. Boyce Thompson Inst.*, 1956, **18**: 339-56, bibl. 16, illus.

Bean seeds were soaked in water supplied with oxygen, carbon dioxide, nitrogen or air for various periods. Their capacity to germinate was partly or entirely lost depending on the gas supplied and length of treatment. $O_2$ was most injurious to the seeds and $CO_2$ protected them from injury. Of 24 different chemical solutions tested for preventing $O_2$ injury, only hydrogen peroxide and, to a lesser extent, crude catalase were effective. Hydrogen peroxide also prevented injury by other chemicals during the soaking periods. Injured seeds absorbed excessive amounts of water. Results of chromatographic analyses showed that injury by $O_2$ was accompanied by an increase in glutamic acid, and a reduction in arginine and γ-aminobutyric acid in both beans and soaking solution. Aspartic acid disappeared entirely under all conditions after 24 hours' soaking. Other amino acids noted were asparagine, serine, alanine, leucine, methionine sulfone and pipecolic acid. The amounts of amino acids leached from the seeds while they were soaking could not account for the injury. Also the addition of amino acids to the soaking solutions did not improve germination, though in cases where germination did occur some beneficial effects were noted on the subsequent growth of the seedlings. Sucrose, raffinose, and an unknown sugar were present in all bean extracts. In general, after 3 hours of soaking, $O_2$-treated seeds appeared to contain more of all sugars than $CO_2$-treated ones. After 24 hours $CO_2$-treated seeds contained much more of each sugar than the $O_2$-treated seeds, owing, at least in part, to excess leaching during extended soaking in the presence of $O_2$. Sorbose, not detected in extracts of dry or soaked seeds, was found in all leachates. Changes in IAA and *p*-aminobenzoic acid content of the beans and of the water in which they were soaked could not be related to changes in germinative capacity. [Authors' summary. For parts I and II see *H.A.*, 21: 581 and 23: 1490.]

1059. Schmidt, H.
Zur Methodik der Prüfung von Beizmitteln für gartenbauliche Sämereien. **(Methods of testing disinfection materials for horticultural seed firms.)**
*NachrBl. dtsch. PflSchDienst. Berlin*, 1956, **10**: 197-202, bibl. 6, illus.

Glasshouse tests are described in which disinfection materials were evaluated, using cucumber seeds artificially inoculated with *Cladosporium cucumerinum.* Other tests are described in which the effect of disinfectants on seed germination and seedling infection was studied with forced seedlings of tomato, snapdragon, beans, lettuce, sweet pea and zinnia.—Biol. Zentralanst., Berlin.

### *Nutrition.*

(*See also* 1084b, 1085e, g, 1242-53, 1484.)

1060. Silva Fernandes, C.
**Investigações sôbre o valor de três *spot tests* para *N P K* na diagnose precoce de enfermidades carenciais e como indicadores de níveis nutricionais. (Investigations on the value of three spot tests for NPK in early diagnosis of deficiency diseases and as indicators of nutritional levels.)** [English summary 1 p.]
*Bol. téc. Inst. agron. Nordeste, Pernambuco* **2**, 1956, pp. 29, bibl. 43, illus.

Colour standards representing 5 levels of N (from 5 to 1,000 p.p.m.) and P (5–200 p.p.m.) were established on filter paper strips with the Griess-Bray reagent [see *H.A.*, 16: 15] and Osmond's reagent. Tests for K were carried out with spots of dipicrylamine on filter paper registering concentrations of 0·15–2%. Tests on petioles of tomato plants grown in nutrient solutions revealed deficiencies of N 10 days, and those of P and K 30 days, before visual symptoms appeared. Young healthy leaves contained 1,000–2,500 p.p.m. of N, 100–200 p.p.m. of P and 0·5% of K.—Univ. Rural, Pernambuco, Brazil.

1061. Toth, S. J., and Kelly, W. H.
**Complete study of farm uses for organic wastes.**
*N.J. Agric.*, 1956, **38**(4): 13-15.

Thirty-nine organic wastes were analysed for ash, N, $P_2O_5$ and $K_2O$, and the contents found are tabulated. In outdoor cylinder tests using a sandy loam soil the yield of snap beans was as good when cocoa shells, tobacco stems or penicillin wastes were used as with a standard 2–1–1 fertilizer; and cocoa shells, poultry manure and tobacco stems had a greater residual fertilizing value than the standard fertilizer. J.R.L.

1062. Itinskij, V. I., and Oster-Volkov, N. N.
**Artificial manure.** [Russian.]
*Sad i Ogorod*, 1956, No. 12, pp. 31-3.

The addition of 32 kg. ammonium nitrate, 13 kg. potassium nitrate, 3·4 kg. ammophos and a catalyst (a mixture of $NaHCO_3$, $MgSO_4$ and $CaCl_2$ in 1 : 1 : 1 ratio) to 1 ton of sawdust of 50% moisture content gave an "artificial manure" of the following composition: cellulose 47%, nitrogen 1·34%, phosphorus (as $P_2O_5$) 0·2%, potassium oxide 0·6% and the catalyst 0·01%. The manure should be applied to soils with neutral or slightly alkaline reaction, i.e. pH 6·5–8·2, to a depth of 1–5 cm. where decomposition begins 2–3 weeks after application. Treatment of sawdust with a water solution of ammonia was also found satisfactory, and both sawdust manures gave higher yields of cabbage, radish, carrot, tomato and lettuce than equivalent rates of a complete mineral fertilizer. Untreated sawdust reduced yields.

1063. Mulder, E. G.
Stikstof in de plant. **(Nitrogen in the plant.)** [English summary 11 lines.]
*Meded. Dir. Tuinb.*, 1956, **19**: 673-90, bibl. 18, illus.

The author briefly surveys the forms in which N may occur in the soil and be absorbed by the plant. Nitrogen metabolism within the plant is also discussed.—LandbProefst. bodemk. Inst., Groningen.

### *Soil and soil treatments.*

(*See also* 1071-73, 1084d, g, m, 1085k, 1977.)

1064. Warnock, R. E.
**Effect of some synthetic polymeric compounds on soil aggregate stability and on yield and composition of plants.**
*Diss. Abstr.*, 1956, **16**: 1195, being *Publ.* 16,694 of 136 pp.

Five selected polymeric compounds and 3 commercial soil conditioners were evaluated for their ability to stabilize soil aggregates. Greenhouse and field trials showed that solutions containing about 0·5% of a conditioner reduced crust formation and improved seedling emergence when finely sprayed on to the seed bed. In some cases vegetable yields were improved by treatment of the topsoil with conditioners at 0·1%. Plant composition did not appear to be affected by the polymers themselves or by the soil aggregation induced by them. In general conditioners containing Na increased the Na content of the plants, appreciably reduced the K content and slightly reduced the Ca and Mg contents. On a treated sandy loam the increased stability of aggregates only lasted for one year under overhead irrigation and intense cultivation. In other tests there was an indication that increased aggregate stability lasted for about 4 years.—Rutgers Univ.

1065. Vigorov, L. I.
**Changes in the mineral nitrogen content of soil during electrical heating.** [Russian.]
*Sad i Ogorod*, 1956, No. 12, pp. 28-31.

Heating of a podzolic soil with electrodes resulted in an increase of ammonium and slight reduction of nitrate nitrogen. Too much ammonium N is unfavourable for plants such as tomatoes, especially in the seedling stage, and mineral N in the nitrate form is preferred. To ascertain that the frame soil is provided with the right amount of the correct type of N, regular soil analysis is recommended, followed by topdressing the plants with either calcium nitrate, ammonium nitrate or liquid manure.

1066. Ozawa, H., and others.
**Experiments on soil fumigation with methyl bromide. No. I. 1. Methyl bromide gas diffusion and its effect on root-nematodes. 2. Its effect on some pathogenic soil fungi.** [Japanese, with English summary ¼ p.]
*Bull. Kanagawa agric. Exp. Stat. hort. Sect.*, 1956, No. 4, pp. 94-102, bibl. 20, illus.

Experiments have shown that vinyl film is suitable for covering greenhouse beds for fumigation, and that 1–2 c.c. of methyl bromide per cu. ft. is needed to control root nematodes, 5 c.c./cu. ft. for *Corticium rolfsii* and larger quantities for damping-off fungi. The covers can be removed after 2 days and the soil used immediately. J.R.L.

1067. Hoglund, C. R., Kidder, E. H., and Vary, K. A.
**Economics of irrigating in Michigan.**
*Quart. Bull. Mich. agric. Exp. Stat.*, 1956, **39**: 208-29, bibl. 4, illus.

Sprinkler irrigation equipment and systems are discussed and factors affecting their economic value are enumerated. In Michigan strawberries, raspberries and vegetables have proved the most profitable crops for irrigation.

### *Machinery and special devices.*

(*See also* 1075, 1079-82, 1084c, p, s, 1197, 1367, 1368, 1371k, 1962, 1991, 1992.)

1068. The Commercial Grower.
*Mechanisation in Horticulture,* Autumn 1956, No. 6, pp. 24-56, illus.

This issue of the review contains articles on: Mist propagation, by E. R. Hoare; Progress in concentrate spraying, by G. J. Rose; and Preparation (of produce) for market, by R. B. Whaley; also articles on glasshouse heating, a cool store for top fruit built by a small grower, and the injection technique in the application of nitrogen.

1069. Stefanelli, G.
Macchina sperimentale per scassi in terreni rocciosi. **(A prototype machine for breaking up rocky ground.)**
*Atti Accad. ital. Vite 1955*, 1956, **7**: 349-70, illus.

Details are given of experiments in progress and of a machine being tested with considerable success for the quick breaking up of rocky subsoils.

1070. Anon.
**"Handy" soil warmer.**
*Comm. Gr*, 1956, No. 3181, p. 1198, illus.

A new type of heater is described which consists of a heating element woven into a flexible glass fibre, the whole being completely enclosed in plastic. The tape is about ½ in. wide, and is either 12 ft. or 20 ft. long. In a soil heating test the cost was less than 1d. for 4 hours' heating.

1071. Staff, C. E.
**Plastic films in farm applications.**
*Agric. Engng St. Joseph, Mich.*, 1956, **37**: 741-6, bibl. 13, illus.

In a review of the many uses for plastic films in agriculture, those of horticultural interest include their use as covers in soil fumigation, for irrigation canal linings, as mulches and for greenhouse construction.

1072. Rebour, H.
Matières plastiques et irrigation. **(Plastics and irrigation.)**
*Fruits et Prim.*, 1956, **26**: 341-3, illus.

Irrigation tubing consisting of 3 parallel plastic tubes 15 m. long, joined along their sides and suitably perforated, supplied water evenly over an area of 102–142 sq. m. according to pressure (ranging from 1 to 7 kg. per sq. cm.). The optimal pressure was 2 kg.

1073. Hammond, L. C., and Popenoe, H.
**Soil moisture measurement for timing irrigation.**
*Proc. Soil Sci. Soc. Fla, 1955*, **15**: 154-64, bibl. 20.

Soil-moisture data from a deep, well-drained sandy soil under citrus trees were collected on 7 dates, using the oven-drying and tensiometric methods. The detailed study showed that tensiometers were as useful as oven-drying for estimating the soil-moisture content over most of the available range. The variance of sample means for the two methods were approximately the same at soil-moisture conditions where precise measurement for irrigation timing would normally be desired. —[From authors' summary.]—Fla agric Exp. Stat., Gainesville.

1074. Anon.
**Prestcold produce machine for water precooling.**
*Comm. Gr*, 1956, No. 3180, p. 1161, illus.
**Hydro-cooler gets premium price for spring cabbage.**
*Grower*, 1956, **46**: 1433, illus.

Equipment has been designed for hydrocooling fruit and vegetables. The produce is passed through a water bath at 35–37° F. The standard hydrocooler has a daily capacity of 500 bushels of apples which can be cooled from 65° F. to 40–45° F.; an apple 3 in. in diameter can be cooled in 30–40 min. About 30 lb. of spring cabbage in an open crate was cooled to about 45° F. in five minutes.

1075. Bean, G., Trickett, E. S., and Wells, D. A.
**Automatic mist control equipment for the rooting of cuttings.**
*J. agric. Engng Res.*, 1957, **2**: 44-8, bibl. 6, illus.

The apparatus described [see also *H.A.*, 27: 60] consists of (i) a sensing element or artificial leaf, (ii) an electrical control unit for which two alternative circuits can be used, (iii) a solenoid valve, and (iv) pipes and nozzles. In addition to its use in providing intermittent mist for cuttings the apparatus has been adapted for watering glasshouse crops automatically. It may also be found possible to use the artificial leaf to provide a measure of both solar radiation and transpiration rate.—Nat. Inst. agric. Engng, Silsoe.

1076. O'Rourke, F. L. S.
**The Bolivar pit method of rooting softwood cuttings.**
*Amer. Nurserym.*, 1956, **104**(10): 9-10, illus.

It is considered that the Bolivar pit method, first devised in tropical Ecuador for the propagation of cacao cuttings, could be useful in the summer propagation of softwood cuttings throughout the temperate zone. Rectangular pits divided into square compartments, individually operated, appear to be the most efficient. They should be dug about 20 in. deep in well-drained soil, a layer of stone or gravel being placed in the bottom, covered by a layer of sand and finally 6–8 in. of rooting medium. The pit is covered with burlap stretched across wires and a rotary water sprinkler is placed over the centre of each compartment to keep the burlap moist. After the cuttings start to root the frequency of watering is reduced and the cuttings are gradually exposed to the light. The air of the pit maintains a cool and uniform temperature and high humidity and the pit is cheap to construct and operate.

1077. Parmeijer, W. L.
**Painting exposed roots *in situ* for photographing.**
*Qd J. agric. Sci.*, 1956, **13**: 66-7, bibl. 1, illus.

A pit is dug at the roots of the plant and the vertical face to be photographed is scraped smooth and sprayed with water to remove 1½ in. of soil and expose the roots. These are then sprayed while the soil is damp with a white paint (diluted with white spirit) using a continuous atomiser. The paint-covered soil is removed. J.R.L.

### *Glasshouses and hotbeds.*

(*See also* 1066, 1068, 1071, 1075, 1084a, r, 1085k, l, 1317, 1866.)

1078. Nordmeyer, H.
**Klarglas leicht überlegen. Ein Beitrag zum Glasartenvergleich. (Hammered glass slightly superior. A comparison of types of glass.)**
*Gartenwelt*, 1956, **56**: 379-81, illus.
Trials in two cucumber houses from 22 February to 22 June, 1955, indicated the slight superiority of hammered glass over ordinary horticultural glass. In the house with hammered glass the mean temperature and humidity were somewhat higher and showed less variation, with the result that early yields (5–15 April) amounted to 55 cucumbers, as compared with 33 under horticultural glass. Climatic data are presented in detail.—Staatl. Lehr- u. Versuchsanst. f. Gartenb., Kassel-Oberzwehren.

1079. Hockey, K. C., and Richards, M.
**Insulating glasshouses with plastic film.**
*Fruit and Prod.*, October, 1956, pp. 14-15, illus.
When 0·0015 in. thick polythene film was attached to the inside of the glazing bars of an unheated glasshouse the inside temperature was increased by 3° F. In heated houses the difference due to insulation was 8–10° F., and, despite decreasing outdoor temperatures, the temperature in the plastic-lined house remained nearly constant.—Massey agric. Coll. J.R.L.

1080. Sch., E.
Ein praktischer Fensterhalter. **(A device for holding frame lights.)**
*Schweiz. Gärtnerztg*, 1956, **59**(48): 2-3, illus.
A metal hinge clipped on to the frame wall prevents the light from slipping when lifted for watering, etc. The simple device is clearly illustrated.

1081. Instituut voor Tuinbouwtechniek, Wageningen.
Verwarming met propaangasbranders. **(Heating with propane gas burners.)**
*Jversl. Inst. Tuinbouwtech., Wageningen, 1955*, pp. 28-9.
Glasshouse heating with propane gas burners had an inhibitory effect on crop growth. Spinach, lettuce and tomatoes showed reduced leaf area, darker leaf colour and yellowing of the lower leaves. Begonia and kalanchoe plants were stunted and the flowers failed to open. Plants grown with propane gas heating at night only also showed inhibited growth; propane heating by day only promoted growth at first, the long term effects being injurious.

1082. Webber, R.
**Mobiles heated with plastic tubing.**
*Grower*, 1956, **46**: 1362-3, illus.
Polythene tubing (150 gauge) with holes in it is used to distribute hot air throughout a movable glasshouse structure. Cold air could also be circulated in hot weather. The advantages of the system are that it is portable, lightweight, adaptable, and circulates enough warmth to keep out frost.

1083. Korol'kov, E. D.
**Heat fixation in covered ground.** [Russian.]
*Sad i Ogorod*, 1956, No. 11, pp. 20-5, illus.
Soil heating in general and steam heating of frame soils in particular are discussed. The use of high pressure steam (3–4 atmospheres) was found to be less satisfactory than that of low pressure steam (0·3–0·5 atmospheres) mixed with air. The temperature of the steam-air mixture is controlled by the amount of air added. A 1 : 1 by weight steam-air mixture is 87° C., 1 : 2 78°, 1 : 3 72° and 1 : 4 68° C. The mixture is applied through perforated asbestos-cement 100 mm. piping placed 35 cm. deep in the soil giving a very even distribution of heat, the differences between soil temperatures at various points at a depth of 10 cm. being not greater than 2–3° C.

### *Noted.*

1084.

a van Aggelen, J., and van Kleffens, E. J.
Dichtingsmateriaal, o.m. voor kassen. **(Sealing material for glasshouses.)**
*Beproevingsrapport I.T.T. Wageningen* **18/6405**, 1956, pp. 6, illus.
Practical tests on "Secomastic".

b Andrews, W. B.
**Anhydrous ammonia as a nitrogenous fertilizer.**
*Advanc. Agron.*, 1956, **8**: 61-125, bibl. 55, illus.
Crop responses, including those of cabbage, tomato, bean and sugar cane.

c Anon.
**New machine for labelling packing cases.**
*Orchard. N.Z.*, 1956, **29**(10): 3.

d Anon.
Irrigazione a pioggia. **(Sprinkler irrigation.)**
*Humus*, 1956, **12**(2): 29-31, illus.
Developments in Europe, particularly in Italy.

e Avron, M., and Jagendorf, A. T.
**An extractable factor in photosynthetic phosphorylation.**
*Nature*, 1957, **179**: 428-9, bibl. 8.
Experiments with spinach chloroplasts.

f Azzi, G.
Fotoperiodismo e termoperiodismo nel quadro delle attività enzimatiche. **(Photoperiodism and thermoperiodism in the field of enzyme activity.)**
*Ann. Fac. Agrar. Perugia*, 1955, **11**: 281-8, bibl. 4.

g BAGLEY, J. M., AND CRIDDLE, W. D.
**Evaluation of sprinkler irrigation systems in northern Utah.**
*Bull. Utah agric. Exp. Stat.* **387**, [1956?], pp. 30, bibl. 18, illus.
Studies on efficiency and costs of existing systems; no crop responses.

h BATE-SMITH, E. C.
**The commoner phenolic constituents of plants and their systematic distribution.**
*Sci. Proc. roy. Dublin Soc.*, 1956, **27**: 165-76, bibl. 8.
Leuco-anthocyanins, flavonols, caffeic acid, sinapic acid, ferulic acid.

i BOJARKIN, A. N.
**A rapid method of polyphenoloxidase activity determination.** [Russian.]
*Trud. Inst. Fiziol. Rast. Timiryazeva*, 1954, **8**(2): 398-403, bibl. 7, illus.
In leaves and fruit by a differential photo-electrical colorimeter.

j BRITIKOV, E. A.
**Physiological-biochemical analysis of pollen germination and pollen tube growth in the tissues of the pistil.** [Russian.]
*Trud. Inst. Fiziol. Rast. Timiryazeva*, 1954, **8**(2): 3-58, bibl. 6 pp., illus.
A fundamental study of the process of pollination in plants which included *Pyrus malus*, *Gladiolus communis*, *Lilium* spp., *Tradescantia* sp., and *Phlox* sp.

k BURDICK, E. M.
**Extraction and utilization of carotenes and xanthophylls.**
*Econ. Bot.*, 1956, **10**: 267-79, bibl. 58, illus.
From carrots, palm oil and alfalfa.

l CAPPELLETTI, C., AND CHIARUGI, A.
Sulla priorità di fondazione degli orti botanici di Padova e di Pisa. **(Priority of foundation of the botanical gardens of Padua and Pisa.)**
*Nuovo G. bot. ital.*, 1953, **60**: 681-4, bibl. 2 [received 1957].

m DEGAN, A.
Prime resultanze dell'esercizio collettivo degli impianti consortili pluvirrigui. **(First results of collective operation of sprinkler irrigation installations for groups of users.)**
*Agric. Venezie*, 1956, **10**: 611-17, bibl. 3, illus.
Problems of interruption and resumption of operation taking advantage of periods of rain are discussed.

n D.S.I.R., NEW ZEALAND.
**Departmental Handbook, New Zealand Department of Scientific and Industrial Research.**
*Inf. Ser. D.S.I.R. N.Z.* **9**, 3rd edition, 1956, pp. 72, illus.
The Department's organization and activities.

o GROOTERS, G. T.
**Horticultural seed growing in the Netherlands.**
*Seed World*, 1956, **79**(8): 8, 10, illus.
Including the system of quality control.

p JENSEN, W. A., AND KAVALJIAN, L. G.
**Notes on the freeze-drying of plant tissue.**
*Stain Tech.*, 1957, **32**: 33-8, bibl. 2, illus.
Improved apparatus described.

q KESSLER, B.
**Effect of methyltryptophan and thiouracil upon protein and ribonucleic acid synthesis in certain higher plants.**
*Nature*, 1956, **178**: 1337-8, bibl. 12.
In olive and vine leaves.

r VAN KLEFFENS, E. J., AND VAN AGGELEN, J.
Dichtingsmateriaal, o.m. voor kassen. **(Sealing material for glasshouses.)**
*Beproevingsrapport I.T.T. Wageningen* **17/6587**, 1956, pp. 6, illus.
Tests with a Dutch make, "Perennator".

s LAMPE, P.
Die Neukonstruktion des Blattabstreifers—ein weiteres Glied in der Reihe der Zusatzgeräte. **(A new protective shield for powerhoes.)**
*Dtsch. Gartenb.*, 1956, **3**: 326-7, illus.
To protect the foliage in row crops.

t MARTH, P. C., AUDIA, W. V., AND MITCHELL, J. W.
**Gibberellic acid—a plant regulator.**
*Seed World*, 1956, **79**(10): 16, 18.
Plant responses summarized. See also *H.A.*, 27: 31.

u MAVRODINEANU, R., AND GWIRTSMAN, J.
**Use of sodium peroxide fusion for the determination of fluorides in vegetation.**
*Contr. Boyce Thompson Inst.*, 1956, **18**: 419-20, bibl. 8.

v MINISTRY OF AGRICULTURE, LONDON.
**Agricultural Statistics: England and Wales. Crops grown in glasshouses (July 1956).**
*Agriculture, Lond.*, 1957, **73**: 485.

w NELDER, J. A.
**Notes on the planning and execution of field experiments.**
*N.A.A.S. Quart. Rev.*, 1956, No. 34, pp. 139-46.

x NORRIS, D. O.
**Legumes and the Rhizobium symbiosis.**
*Emp. J. exp. Agric.*, 1956, **24**: 247-70, bibl. 49.

y NYSTROM, C. W.
**Studies on flavonoid and anthocyanin pigments.**
*Diss. Abstr.*, 1956, **16**: 1334, being *Publ.* 16,762 of 100 pp.
Using apricots, *Coleus* and spinach.

z PIENAAR, W. J.
**The flame-photometric analysis of plant and soil extracts and water samples.**
*Decid. Fruit Gr*, 1956, **6**: 228-30.
A popular account of the process as practised at the Western Province Fruit Research Station, Stellenbosch, S.A.

1085.

a SALMINEN, M.
Sisä-Suomen puutarhaviljelystä. (**Horticulture in the interior of Finland.**) [Germany summary 23 lines.]
*Maatalous ja Koetoim.*, Part 10, 1956, pp. 209-15, illus.

b SCHARRER, K., AND MENGEL, K.
Spektralphotometrische Bestimmung des Magnesiums in Bodenauszügen und Pflanzenaschen. Vorläufige Mitteilung. (**The determination of magnesium in soil extracts and plant ashes by spectral photometry. Preliminary communication.**)
*Landw. Forsch.*, 1956, **9**: 204.

c SMITH, F. G.
**N.A.A.S. Experimental Horticulture Stations: Stockbridge House.**
*Agriculture, Lond.*, 1957, **63**: 533-6.
Work summarized.

d STOUGHTON, R. H.
**Crop production without soil.**
*Agric. Rev., Lond.*, 1957, **2**(10): 29-35, bibl. 11, illus.
Methods compared and discussed. [See also *H.A.*, 27: 40.]

e STOUT, P. R.
**Micronutrients in crop vigor.**
*J. agric. Food Chem.*, 1956, **4**: 1000-6, illus.
A review.

f TANADA, T.
**Effect of sulfhydryl inhibitors on rubidium absorption by excised mung bean roots.**
*Plant Physiol.*, 1956, **31**: 403-6, bibl. 16.
See *H.A.*, 26: 92.

g THORNE, G. N.
**Application of nutrients to crops as leaf sprays.**
*Agric. Rev., Lond.*, 1957, **2**(8): 42-5, bibl. 14.
A review.

h LE TOURNEAU, D., FAILES, G. D., AND HEGGENESS, H. G.
**The effect of aqueous extracts of plant tissue on germination of seeds and growth of seedlings.**
*Weeds, N. York*, 1956, **4**: 363-8, bibl. 6, illus.
Aqueous extracts of dried plant material representing 23 species inhibited the seedling growth of both wheat and peas.—*Weed Abstr.*, **5**, No. 1668.

i TURNER, J. S., TODD, M., AND BRITTAIN, E. G.
**The inhibition of photosynthesis by oxygen. I. Comparative physiology of the effect.**
*Aust. J. biol. Sci.*, 1956, **9**: 494-510, bibl. 15.

j VIRGIN, H. I.
**Some notes on the fluorescence spectra of plants *in vivo*.**
*Physiol. Plant.*, 1956, **9**: 674-81, bibl. 11.

k VOGEL, G.
Ein Fortschritt in der Frühbeetkastenberegnung. (**Progress in the sprinkler irrigation of hot beds.**)
*Dtsch. Gartenb.*, 1956, **3**: 328-9, illus.
A new [East-] German model described. [See also *H.A.*, 26: 3295.]

l WALLS, I. G.
**Greenhouses for the small garden.**
*Adv. Leafl. W. Scot. agric. Coll.* **62**, [1956], pp. 4, illus.
Notes on siting and types.

m WARD, W. E.
**Garden shelter from a glass fence.**
*N.Z. J. Agric.*, 1956, **93**: 453, illus.
Made from waste glass.

n WARINGTON, K.
**Investigations regarding the nature of the interaction between iron and molybdenum or vanadium in nutrient solutions with and without a growing plant.**
*Ann. appl. Biol.*, 1956, **44**: 535-46, bibl. 12, illus.
Peas and soya beans used.

o WOLF, F. T.
**Absorption spectra of the anthocyanin pigment of red cabbage: a natural wide-range pH indicator.**
*Physiol. Plant.*, 1956, **9**: 559-66, bibl. 20.

## TREE FRUITS, DECIDUOUS.

### *General.*

(*See also* 1187b, e, m, n, t, 1188, 1865, 1966, 1984, 1998.)

1086. BOWMAN, F. T.
**Horticultural Research Record No. 1.**
[*Publ.*] *N.S.W. Dep. Agric. Div. Hort.*, 1956, pp. 63.
Some of the fruit research projects that have been carried out by the Division since 1930 are reviewed under the following headings: *Permanent plantings. Apple:* rootstock trials; pruning trials; twisting of Gravenstein; boron deficiency; breeding. *Pear:* rootstock trials; bumpiness of Williams; breeding. *Peach:* canning variety trials; soil management (cover crops) and pruning trial. *Apricot:* internal breakdown; introductions and breeding. *Prune:* pre-harvest drop (as affected by moisture stress); biennial pruning; breeding. *Cherry:* breeding. *Citrus:* rootstock experiment with oranges; improvement trials; breeding. *Annual and recurrent experiments. Hormone sprays*

for thinning apples, plums and peaches; for controlling pre-harvest drop of apples, pears and citrus; for hastening maturity of apples, peaches, apricots and prunes; for regulating cropping of lemons. *Urea foliage sprays* for apples, peaches and citrus. *Lead arsenate and superphosphate* sprays for controlling quality and maturity of oranges. *Rootstock trials* with Malling-Merton apple clones and nematode-resistant peaches. *Seed germination trials* with peaches, cherries and passion fruit. *Rooting depth and concentration* of rough lemon and trifoliate orange rootstocks. *Irrigation* of oranges. *Fruit storage research* on pears and apples. *Freezing* of peaches, cherries, strawberries, raspberries, pineapples, peas and beans. *Citrus waste research.*

1087. Spurling, M. B., and Cowley, R. W. I.
**Blackwood Experimental Orchard—a progress report, 1955-56.**
*J. Dep. Agric. S. Aust.*, 1956, **60**: 202-6, illus.

The Blackwood Experimental Orchard, situated in hilly land at the head of the Coromandel Valley, was established in 1908. Soil erosion was a serious problem in the original plantings, and contour planting has formed part of a general scheme of re-organization started in 1940. Very large variety collections of apples, pears, peaches, nectarines, apricots and plums have been drastically reduced in numbers, and a collection of 23 wine grapes has been established. Preliminary results are reported on apple scab control trials with new fungicides and on the use of surfactants in concentrate sprays of fungicides and insecticides. Other work in progress includes pruning, irrigation and soil management trials on deciduous fruits, the selection of nematode-resistant tomatoes and wilt-resistant peas, and the cool and gas storage of fruits.

1088. Butijn, J., and van der Boon, J.
Correcties in opbrengsten van vruchtbomen in verband met de boomgroote. **(Correcting fruit tree yields in relation to tree size.)** [English summary ½ p.]
*Meded. Dir. Tuinb.*, 1957, **20**: 40-5, 48, bibl. 6, illus.

Three measurements which might be used as a means of converting variable tree sizes within an experiment to a standard were tested. The most accurate was measurement of total length of fruit-bearing branches. The other 2 measurements, of crown diameter and trunk circumference, were less accurate but were also suitable for conversion purposes.

1089. Woods, J. J.
**Pear orchard experiences.**
*Publ. Domin. exp. Fm, Saanichton, B.C.* **163**, 1956, pp. 19, bibl. 10, illus.

Detailed information is given on the management of and problems associated with a Bartlett pear orchard planted in 1939 in the Sidney, Vancouver Island, district. Yields were low owing to serious infection with blossom blast, caused by *Pseudomonas syringae*. Streptomycin did not control the disease. Critical observations are made on scab control, pruning, tillage, fruit thinning, picking and grading practices. Operating expenses are analysed.

1090. Grassi, U.
Sulla coltivazione dell'albicocco e dell'anona in Egitto. **(Cultivation of apricots and annonas in Egypt.)** [English summary 1 line.]
*Riv. Agric. subtrop.*, 1956, **50**: 555-9.

Cultural practices and control of pests and diseases are described for 2 indigenous and 4 introduced varieties of apricot. Cultivation of custard apple (*Annona squamosa*), cherimoya (*A. cherimola*) and *A. muricata* is ebrifly described.

1091. Condit, I. J., and Enderud, J.
**A bibliography of the fig.***
*Hilgardia*, 1956, **25**: 1-663.

This monumental work forming the whole of volume 25 of *Hilgardia* follows the same lines as the senior author's bibliography on the avocado [*H.A.*, 10: 413 and 21: 3091]. The references are arranged under 55 subject headings and an author index is provided. Most of the references are briefly annotated. In addition to sections on fig growing in various countries, individual cultural practices, etc., there is a section on the fig in Bible times and another on legends, folklore and poetry.

### *Breeding and varieties.*

(*See also* 1187q, s.)

1092. Haskell, G.
**Man, polyploidy and fruit tree growing in Britain.**
*Evolution*, 1955, **9**: 291-301, bibl. 30, maps.

To help determine what influences man in his choice of fruit-tree varieties, the role of polyploidy in cultivated fruit-tree growing in Britain was studied for apples and cherries. County ploidy ratios (CPRs) were calculated as the ratios of the number of polyploid to diploid trees, 7 years old and over, for each county of England and Wales. The CPRs of triploid Bramley, diploid Cox, tetraploid sour cherries and diploid sweet cherries were mapped. Factors affecting CPR distribution were evaluated. Although relatively more polyploid fruit-trees are grown in northern than in southern England there is no county correlation between CPRs of apples and cherries. This indicates that fertility factors are swamped by other influences directly or not resulting from polyploidy.—John Innes hort. Instn, Hertford.

1093. Instituut voor de Veredeling van Tuinbouwgewassen.
8e *Beschrijvende Rassenlijst voor Fruitgewassen 1957.* **(8th Descriptive list of fruit varieties, 1957.)** Wageningen, 1957, pp. 137.

All the fruit and nut species commonly grown in Holland including a number of English varieties are dealt with, and a few notes are also given on rose hips for vitamin C extraction, figs, blueberries, medlars and mulberries.

1094. Thiele, I.
Progressive Frostresistenzprüfungen an Kernobstsämlingen. **(Frost resistance tests with pome fruit seedlings at two developmental stages.)**
[*Mimeo.*] *Diss. Inst. Obstb. tech. Univ. Berlin* **59(D83)**, 1956, pp. 61, bibl. 18, illus.

* Being Paper 888 Citrus Exp. Stat., Riverside, Calif.

The work described had two objects, viz. to study (1) the effect of environmental and genetical factors on the frost resistance of germinating apple and pear seeds, (2) the relationship between the frost resistance of young seedlings and that of one-year-old plants. (1) *Germinating seed.* Seedlings with root lengths ranging from <2 mm. to 15 mm. were exposed to −4·5° C. for 1 hour. Surviving seedlings were termed fully resistant if the root remained uninjured and partly resistant if the radicle was killed but adventitious roots were formed. Resistance to cold was found to decline with length of root. Hardiness was shown to be greatly affected by such factors as weight of seed, moisture of sand used for stratification, time elapsing between cold treatment and sowing, and temperature conditions after treatment. No relationship existed between date of germination and hardiness. There were distinct differences between varieties, but in some cases the response to frost of the seedlings differed from that of the maternal parent variety. The response of the progeny from crosses was generally similar to that of the progeny from the maternal parent variety. Even where the response of the male parent differed markedly from that of the mother, no paternal influence was recognizable in the progeny. On the whole, pear seedlings proved more susceptible than apple seedlings. (2) *One-year-old plants.* The tests were carried out at the end of January or the beginning of February by exposing the shoot (cut down to 15 cm.) and roots for 15 minutes to temperatures ranging from −6° C. to −12° C. The treatment was preceded by a 20–25 minute period of cooling at a higher temperature. The number of surviving plants was found to rise with an increase in the diameter of the root collar. Precooling of the plants at −3° C. for 18 hours increased hardiness. The degree of discoloration in the wood of the root collar zone observed on removal of the bark some time after treatment was not a safe indication of the degree of frost resistance. The degree of hardiness in table varieties of apples was similar to that of pears, but perry varieties showed, on the whole, greater resistance than cider varieties. With two exceptions there was little agreement between the results obtained with germinating seed and those obtained in tests with one-year-old plants. As, however, the response of young seedlings to cold treatment is determined by a variety of incompletely known environmental factors the hope remains that a closer agreement between the two stages may become apparent with better knowledge of the factors that govern hardiness in germinating seed. In that case selection for frost resistance would become greatly simplified.

1095. Klein, L. G., and Einset, J.
**Performance of newer apple varieties in New York.**
*Fruit Var. hort. Dig.*, 1956, **11**: 23-5.

The main characteristics are described of 8 new processing or dual-purpose apple varieties tested in New York State. In order of maturity they are: Wellington (Cortland × Crimson Beauty), Beacon (Malinda × open), Webster (Ben Davis × Jonathan) × (Ben Davis × Jonathan), Graham (probably a Northern Spy seedling), Monroe (Rome Beauty × Jonathan), Fyan (Ben Davis × Jonathan), Idared (Jonathan × Wagener) and Jerseyred (Gallia Beauty × White Winter Pearmain). Webster is considered the outstanding autumn culinary and processing variety.—N.Y. St. agric. Exp. Stat., Geneva.

1096. Groh, W.
Der Anbauwert des "Dülmener Rosenapfels" und seine Verbreitung in der Deutschen Demokratischen Republik. (**The apple variety Dülmener Rosenapfel and its distribution in the German Democratic Republic.**)
*Dtsch. Gartenb.*, 1956, **3**: 329-32, illus.

This hardy and scab-resistant variety, a seedling from Gravenstein, has a good flavour and keeps well. Its special merit is that it thrives at high altitudes as well as elsewhere.

1097. Berzin, A.
**Frost resistance of apple varieties.** [Russian.]
*Sad i Ogorod*, 1956, No. 10, pp. 46-7.

In the Veliklukskaja region during the winter of 1955–56 temperatures dropped to −47° C. and only the varieties Kitajka zolotaja rannaja [Early Golden, *Malus prunifolia*] and Osennee polosatoe (Štrejfling [Streaky]) escaped serious frost damage and produced fruit in 1956.

1098. Morettini, A.
La Butirra Precoce Morettini—incrocio Coscia × William 59/IV. (**Morettini's Butirra Precoce, a hybrid from Coscia × Williams 59/IV.**) [English summary 6 lines.]
*Riv. Ortoflorofruttic. ital.*, 1956, **40**: 359-67, illus.

The new pear variety Butirra Precoce is compatible with quince rootstocks. It is vigorous, heavy cropping, early ripening and suitable for prolonged storage.

1099. Lapins, K., and Hornby, C. A.
**Leaf measurements as a means of identification of peach varieties in nursery trees.**
*Canad. J. agric. Sci.*, 1956, **36**: 409-21, bibl. 13, illus.

Ten different measurements or counts were made on leaf samples of 5 peach varieties in 6 locations over 3 years with the object of testing the possibility of identifying varieties in the nursery. Of the 10 leaf-measurements, length of blade, width of blade, base angle, apex angle, and length of petiole showed higher discriminative values than the other measurements under test. Measurements assisted considerably the visual method of identification. However, none of these measurements alone made it possible to distinguish between certain varieties that were very similar in their leaf characteristics. Large leaves from the middle portion of the central shoot of the nursery tree gave the most reliable samples. [Authors' abstract.]—Canada Dep. Agric., Summerland, B.C., and Univ. B.C., Vancouver.

1100. Baldini, E.
Osservazioni sulla resistenza al freddo delle cultivar di pesco nell'inverno 1956. (**Observations on cold resistance in peach varieties in the winter of 1956.**) [English summary 2 lines.]
*Riv. Ortoflorofruttic. ital.*, 1956, **40**: 483-93, bibl. 26, illus.

More than 100 varieties growing near Florence were examined for frost injury resulting from very low February temperatures, and were classified for frost resistance according to the percentage of flower buds destroyed.

1101. Evreinoff, V. A.
Contribution à l'étude des ancêtres des cerisiers de culture. **(A note on the origin of cultivated cherries.)**
*Arboric. fruit*, 1956, No. 33, p. 15, No. 34, p. 13.

The author considers that among cherry species only 4 can be considered as ancestors of our present varieties. These are *Cerasus vulgaris*, *C. fruticosa*, *C. tomentosa* and *C. besseyii*. The characters of *Cerasus avium* (=*Prunus avium*) are so different from those of the other species that it probably really belongs to a different genus. Details are given of the characters of these 5 species and their habitats.

1102. Evreinoff, V. A.
Les ancêtres de nos abricotiers. **(The ancestors of the apricot.)**
*Fruits et Prim.*, 1956, **26**: 366-70, bibl. 8.

The author considers in turn the characters and habitats of the following: *Armeniaca sibirica* (syn. *Prunus sibirica armeniaca*), *A. manshurica*, *A. dasycarpa*, *A. ansu*, *A. mumé*, *A. holocericea*, *A. vulgaris*. He notes that the apricot is essentially a tree of the uplands in temperate regions, where it bears regularly and is not liable to damage by late spring frosts, a fate it so often suffers in the plains.

### *Propagation and rootstocks.*

(*See also* 1076, 1187g, o, r, 1245.)

1103. Floor, J., Wezelenburg, P. A., and van Doesburg, H. H.
Proeven met vermeerdering van houtige gewassen. **(Experiments on the propagation of woody plants.)** [English summary ½ p.]
*Meded. Inst. Vered. Tuinbouwgew.* **82**, 1956, pp. 17, bibl. 11, illus.

Three separate experiments are reported on here. I. Layering as a means of plant propagation is described and results obtained with several fruit and birch varieties are reported. Rooting with Pershore was only moderate and several of the layers were too large for budding; good rooting was obtained with F 12/1. Quince was less susceptible to frost in the layer bed than in a stool bed. Early Laxton rooted better than St. Julien A, and Monsieur hâtif and Belle de Louvain also gave satisfactory results. Sweykhuizen layered better than other Reine Claude varieties. In general Victoria and Ontario plums rooted better than Doyenné and Czar. The gooseberry variety Crownbob was successfully propagated by cuttings and by layering. *Betula pendula dalecarlica* layers showed the best rooting of the birch species tested. Rooting of *Prunus glandulosa sinensis* in layer beds was improved by planting in October/November. Layering of *Prunus subhirtella autumnalis* and of several street tree species was also successful. Good rooting was also obtained from layered Manks Codlin and Meikers. II. In general cuttings of several ornamental species which were taken during the first half of September rooted satisfactorily in a temporary plastic-covered frame. III. The vine variety Black Alicante was successfully grafted on Foster's White Seedling by the bench-grafting method developed at Geisenheim.

1104. Bolotskij, Ju. S.
**Stratification of seed without substrate.** [Russian.]
*Sad i Ogorod*, 1956, No. 12, pp. 57-8, illus.

Seed of the Siberian apple, kept in a cellar under a double layer of damp muslin at 0–2° C., germinated as well as seed stratified on ice [see *H.A.*, 25: 1300] and better than that stratified by the usual method in sand.

1105. Zaliwski, S.
Pikowanie przedsiewne. **(Pricking out before sowing.)** [Russian and English summaries ½ p. each.]
*Prace Inst. Sadown. Skierniewice*, 1955, **1**: 43-65, bibl. 6, illus.

Pricking out of apple rootstock seedlings to produce a fibrous root system can be replaced by a pre-sowing treatment to stimulate branching of the root system. The rootlets of germinating seeds were broken off when the roots were 20 to 50 mm. long by forcing the seeds through a fine mesh wire screen. Among the species studied were *Pyrus ussuriensis*, crab apple and *Prunus cerasifera*. [See also *H.A.*, 23: 3809.]

1106. Cabolov, R. G.
**A new method of budwood storage.** [Russian.]
*Sad i Ogorod*, 1956, No. 12, pp. 67-8.

In Dagestan, artificial cold storage being unavailable, budwood cut during the winter was stored upright in damp sand in a cellar until the end of March. It was then laid in layers of dry sand in a trench in the cellar and covered with tamped soil so as to reduce access of air. On removal from storage for grafting in April and May apple budwood was found to be in very good condition and without previous soaking it gave a high percentage of take.

1107. Horticultural Crops Research Branch. *
**Dwarf fruit trees, selection and care.**
*Leafl. U.S. Dep. Agric.* **407**, 1956, pp. 8, illus., 5 cents.

A simple elementary leaflet for the would-be user in the U.S.A. of dwarfing stocks for apples, Malling IX, VIII, II or VII, or Angers quince for pears.

1108. Anon.
**Apple rootstocks.**
*Rur. Res. C.S.I.R.O.*, 1956, No. 17, pp. 27-30, bibl. 4, illus.

Rootstock problems which have been studied at Stanthorpe in Queensland are discussed. Results have shown that in this district better returns and less variability have been obtained by the use of Malling and Merton stocks than by that of seedling rootstocks.

1109. De la Rocha G., G.
Ensayo del sobreinjerto en el manzano. **(Experiment in double working of apple.)**
*Inf. mens. Estac. exp. agric. La Molina*, 1956, **30**(347): 16-19.

* Agricultural Research Branch, U.S.D.A. This leaflet supersedes *Leafl.* 178.

The apple variety Winter Banana was grafted on quince rootstocks direct and with various interstocks. The best results were given with San Antonio or Peromanzano apples as interstocks. Pera de Agua was less satisfactory and Pera-perilla showed poor compatibility. Simultaneous grafting of San Antonio on the quince rootstock and with Winter Banana as scion was successful, but the trees did not develop strongly.

1110. Baudewijn, J.
La détermination de la valeur des plantations fruitières à basses-tiges. **(The determination of the value of intensive short-stemmed fruit plantations.)** [English and German summaries 5 and 6 lines respectively.]
*Rev. Agric. Brux.*, 1956, **9**: 1315-27.

In his book *Waardebepaling van fruitbomen* (3rd ed. 1946) Ing. Hiemeleers presents formulae for calculating the value of standard fruit trees and plantations. In this article a modification of his method is suggested for application to intensive plantations of apple and pear trees on dwarfing rootstocks, for purposes of compensation.

1111. Umhauer, M.
Zur Frage der Birnenunterlagen. **(On the problem of pear rootstocks.)**
*Dtsch. Gartenb.*, 1956, **3**: 298-9.

Graphs show the effect of the rootstock (Quince A and seedling) on the yield of pears, planted in 1941, for the period 1948–55. Two varieties, Clapps Favourite and Alexander Lucas, were used in these trials on sandy loam and on loamy sand. On both soils and with both varieties yields of trees on seedling soon caught up with those of trees on Quince A, but in view of the greater vigour of the resulting trees the figures for seedlings were less favourable if considered per unit area. In central Germany, where winter hardiness is a major problem, Quince A remains therefore at present irreplaceable for the more vigorous varieties, the culture of which should be confined to sheltered locations. Seedling rootstocks are recommended for less vigorous varieties.—Inst. Gartenbau, Dresden-Pillnitz.

1112. Plehanov, Ju. S.
**Wild fruit trees and their use.** [Russian.]
*Sad i Ogorod*, 1956, No. 11, pp. 54-6.

Some wild fruit trees growing on the mountain slopes of Tadzikistan provide a good source of drought-resistant seedling rootstocks. Brief notes are given on Buhara pear, Sivers apple, cherry plum, mahaleb, Buhara almond (for peach, sweet almond and plum) and dwarf sour cherry.

### *Growth phenomena.*

(*See also* 1032.)

1113. Scaramuzzi, F.
Ricerche sulla differenziazione delle gemme in alcune specie arboree da frutto. **(Studies on bud differentiation in some tree-fruit species.)** [French, German and English summaries ⅔ p. each.]
*Nuovo G. bot. ital.*, 1953, **60**: 1-101, bibl. 237, illus. [received 1957].

Defoliation was carried out on branches of plum, peach, cherry, apple and pear at various dates in the spring and summer of 2 consecutive years. Differentiation of flower buds occurred over a considerable period, in general becoming irreversible in June, July and August. Specific and varietal differences in time of differentiation were less marked than those for individual varieties from year to year. The earlier the defoliation the greater was the delay in opening of flower buds. In plum and pear the opening of leaf buds was similarly affected. In peach the order of opening of flower buds was the reverse of the order in which they were differentiated. Fruit size in plum and peach was reduced by defoliation, particularly where this was carried out early in the season.

1114. Kolomiec, I. A.
**Conditions of flower and vegetative bud development in apples.** [Russian.]
*Trud. Inst. Fiziol. Rast. Timiryazeva*, 1954, **8**(2): 361-97, bibl. 19, illus.

A detailed description is given of experiments showing that fruit bud initiation and development are dependent on the composition and concentration of the sap in the meristematic cells and are affected by such factors as nutrition and ringing. [For shorter accounts of essentially the same work see *H.A.*, 23: 172, 1544 and 2605, and 26: 184.]

1115. Vitolović, V.
Vegetativni prirast i životna trajnost sortimentskog jabučika na plitkom i zaledinjenom zemljištu krša. **(Vegetative growth and longevity in a selected apple orchard on shallow sod-soil over limestone.)** [English summary 1½ pp.]
Reprinted from *Rad. Odjelj. privr.-teh. Nauka*, 1955, **5**(1): 111-29, bibl. 12.

In 1934 trials were started at the School of Agriculture at Poreč in Western Istria to study the behaviour of 13 apple varieties under Mediterranean conditions. Doucin rootstocks were used and the trees were grown in grass except for a cultivated area around the trunks. Soil moisture was near wilting point so that growth and yields were poor and the orchard had to be grubbed in 1947. Great variability in drought-resistance was observed; in Red Delicious the average increase in terminal growth in 1946 was 2,546 cm., while in Reinette Ananas no terminal growth was made. There was little evidence of positive correlation between total weight of top and trunk girth.

1116. Megli, V.
Prove di degemmazione nel pesco e loro effetti sulla istogenesi della cerchia legnosa. **(Disbudding experiments with peach trees and their effects on the formation of woody tissue.)** [English summary ⅓ p.]
*Nuovo G. bot. ital.*, 1955, **62**: 41-74, bibl. 14, illus.

Removal of buds increased the width of the annual ring of wood, which showed a marked increase in vessels at the expense of fibres. Cambial activity was prolonged beyond that in untreated stems. Defoliation completely inhibited cambial activity.

1117. Mancuso, B.
**Anomalie anatomiche nel legno di rami di ciliegio sottoposti a defogliazione. (Anatomical anomalies in the wood of defoliated cherry branches.)** [English summary 4 lines.]
*Nuovo G. bot. ital.*, 1955, **62**: 335-44, bibl. 4, illus.

The thickness of annual rings was approximately directly proportional to the amount of foliage and inversely proportional to the density of flowering of the branch. Defoliation markedly reduced the number and length of wood fibres and the diameter of wood vessels. Early defoliation checked the differentiation of flower buds for the following year.

1118. Smeets, L.
**Some effects of the photoperiod on the shoot growth of cherry seedlings.** [Dutch summary ⅓ p.]
*Euphytica*, 1956, **5**: 238-44, bibl. 8.

The effects of 8- and 16-hr. photoperiods were studied on the shoot growth of first and second year seedlings of Limburgse boskriek cherry grown in a phytotron at a constant temperature of 20° C. The effect of a 24-hr. photoperiod was also studied on second year seedlings. In first year seedlings many of the plants under 8- and 16-hr. photoperiods terminated shoot growth at the same time, but some plants with an 8-hr. daylength stopped growing sooner and some with a 16-hr. daylength stopped growing later. In second year seedlings growth stopped at about the same time under all the photoperiods tested.—Inst. hort. Plant Breed., Wageningen.

1119. Rao, S. N., and Crane, J. C.
**The relationship of leaf area and internodal length to fruiting habit of the fig.**
*Indian J. Hort.*, 1956, **13**: 57-63, bibl. 11.

In the 4 fig varieties studied there was a progressive increase in fruitfulness from the basal to the fourth node, after which fruitfulness decreased to the shoot tip. In the Kadota and Calimyrna varieties the median nodes produced the highest percentage of double figs. The highest fruit set occurred at median nodes in Calimyrna. Both length of internode and leaf area increased from the basal to the median nodes and then decreased. Fruit diameter in all varieties except Calimyrna decreased from the first to the ninth node; in Calimyrna fruit diameter followed a pattern similar to that shown by leaf area.

1120. Bujanov, M. F.
**Secondary (autumn) flowering and fruiting in white mulberry.** [Russian.]
*Bot. Žurnal*, 1956, **41**: 1490-5, bibl. 2, illus.

Autumn flowering and fruiting occurred on mulberry shoots with broken tips and was induced by pruning in early August. A comparison was made between the germination of the seed of the primary and secondary fruits; at relatively low temperatures, i.e. 12–16° C., the secondary seed showed higher germination. Seedling growth is being studied.

1121. Self, R. L., and Ward, H. S., Jr.
**Effects of high soil temperature on root growth of loquat seedlings in nursery containers.**
*Plant Dis. Reptr.*, 1956, **40**: 957-60, bibl. 7, illus.

Temperatures above 35° C. were recorded in the soils of green and black cans exposed to high solar radiation. Examination of the root systems of 1-year-old loquat seedlings grown in the cans revealed that root growth was retarded on the side exposed to direct radiation and extensive on the shaded side (soil temperature near 30° C.). Soil temperatures above 30° C. for periods of more than 2–4 hr. have been reported to cause partial or complete cessation of growth. This appears to be the explanation for the one-side root growth of the loquat seedlings. It is suggested that unpainted or light coloured cans should be used, the beds orientated in a N–S direction and shielded from direct radiation, or the cans should be buried in the ground or in sawdust.—Ala. Poly. Inst. agric. Exp. Stat., Spring Hill and Auburn.

### *Pollination.*

(*See also* 1084j, 1187h, l, 1356, 1362, 1413e.)

1122. Johansson, E.
Undersökningar av befruktningsförhållanden hos fruktsorter vid Alnarp 1945–1955. **(Investigations on fertility of fruit varieties at Alnarp, 1945-1955.)** [English summary 1 p., Esperanto summary ¾ p.]
*Meddel. Trädgårdsförs. Malmö* **101**, 1956, pp. 56, bibl. 6, illus.

Flowering times are given for apple, pear and plum varieties in Sweden. Pollen germination was poor in triploid apples and pears, but generally good in diploids and tetraploids. Intersterile varietal groups are listed for apples, some including triploids. Laxton's Progress pear has been added to the incompatible Williams group. Among *Prunus* rootstocks Ackermann, Marianna and Myrobalan B were self-sterile and Brompton, Brokig spilling (Kroosjes gelb), Common Mussel and Pershore were self-fertile. The following species hybrids were among those obtained in pollination trials: myrobalan × apricot; *Prunus triflora* (Beauty) × *P. domestica* (Opal); *P. persicoides* × *Amygdalus communis*.

1123. Nesterov, Ja. S.
**The role of maternal pollen in intervarietal pollination of apple.** [Russian.]
*Agrobiologija*, 1956, No. 4, pp. 132-5.

Tabulated results are given showing that while cross-pollination was better than self-pollination the addition of maternal pollen to that of the pollinating variety in general improved fruit set, increased the number of seeds and in some cases improved seed germination and seedling growth.

1124. Schander, H.
Über den Einfluss verschiedenen Pollens auf die Fruchtgestaltung bei der Birnensorte "Conference". (Vorläufige Mitteilung.) **(Preliminary report on the effect of different pollens on fruit shape in the pear variety Conference.)**
*Mitt. ObstVersuchsringes Jork*, 1956, **11**: 259-65, bibl. 10, illus.

Pollination with diploid and triploid apple and pear pollen was included in 6 treatments applied to flowers of Conference trees. The type of pollen and flower position were found to affect fruit set and shape, seed

number in the fruit, and degree of June drop. Pollination by diploid pear varieties produced the best quality fruits. Misshapen fruits frequently occurred after pollination by apple.

1125. Roberts, D.
**Sugar sprays aid fertilisation of plums by bees.**
*N.Z. J. Agric.*, 1956, **93**: 206-11, illus.

Observations during 1951–55 showed that 99% of the insect visitors to plum trees were honey bees. These are not normally interested in flowers in which the nectar has a sugar concentration of less than 25%, and plum nectar, varying from 1% to 32% sugar, is normally low until it is increased by evaporation. In many plum orchards other competitive sources of nectar nearby have been responsible for poor fruit set, and trials in 1954–55 have shown that plum blossoms can be made more attractive to bees by spraying them with a 20–30% sugar solution in the late morning and early afternoon each day. The number of bees per tree was increased from 6 to 300 by the first spray and to 500 after the second.—Dep. Agric., Auckland. [See also *H.A.*, 26: 1426 and 27: 118.] J.R.L.

1126. Rjabova, A. N.
**Fruit set in cherries pollinated with pollen mixtures of good pollinators.** [Russian.]
*Doklady vsesojuz. Akad. seljsk. Nauk*, 1956, **21**(9): 29-31, bibl. 6.

Pollination of 5 commercial cherry varieties with mixed pollen resulted, in general, in a higher percentage of fruit set than pollination with the individual pollen components.

1127. Valdeyron, G., and Crossa-Raynaud, P.
Contribution à l'étude du régime de la fécondation chez l'abricotier. **(Contribution to the study of the system of fertilization in apricots.)** [English, German and Russian summaries ½ p. each.]
*Ann. Amél. Plantes*, 1956, **6**: 217-38, bibl. 25, illus.

Anthers were collected at the "pink bud" stage, allowed to dehisce in dry air, and rubbed lightly on a 100-mesh sieve to extract pollen, which was stored in a refrigerator. The most satisfactory emasculating tool was a pair of fine curved forceps. Pollination was better effected with a finger tip or brush than with a dusting apparatus. Bags of strong transparent paper were tied over pollinated twigs with aluminium-reinforced cellophane strips. Of the 11 varieties involved, 6 (mainly early Tunisian types) were self incompatible. Crosses between some of these showed different degrees of intercompatibility. Early maturity, high yield and good canning quality can probably be combined by breeding.—Serv. bot. agron. Tunis.

1128. Sazikin, U. V.
**Orchard trees and bushes as honey plants.** [Russian.]
*Pchelovodstvo*, 1955, No. 4, pp. 30-4, from abstr. in *Bee World*, 1956, **37**, abstr. 292/56.

The daily yield of nectar per 100 flowers is estimated for various fruit plants as follows: red currant, 23–44 mg.; white currant, 27–32 mg.; plum, 96–174 mg.; cherry, 81–230 mg.; pear, 84–85 mg.; apple, 326–709 mg.

### *Spraying for cultural purposes.*

(*See also* 1187c.)

1129. Richards, R. R.
**Apples and pears—crop regulation by thinning.**
*Tasm. J. Agric.*, 1956, **27**: 205-9.

An account is given of 5 years' experiments on the response of Tasmanian apples and pears to thinning by MCPA and NAA. NAA has proved the more satisfactory, and recommended concentrations for use on 12 apple varieties and 3 pear varieties are tabulated. J.R.L.

1130. Samish, R. M., and Steiner, A.
**Improvements in the control of preharvest drop of apples.** [Hebrew.]
*Hassadeh*, 1956, **37**: 119-22.

Fruit drop control sprays were applied to mature Jonathan apple trees in the course of two seasons at 15 p.p.m. concentration (10 p.p.m. during the second season) 3 weeks before harvest. NAA produced no improvement during the first season, but resulted in a significant reduction of drop during the second. 2,4,5-TPP was much better at reducing fruit drop than NAA, reducing the drop to 25% as compared with 48% in the control. A mixture of equal amounts of both substances gave intermediate results. [English abstract provided by R. M. Samish.]

1131. Pieniążek, S. A., Soczek, Z., and Cegłowski, S.
Zapobieganie przedwczesnemu opadaniu jabłek przy pomocy oprysków syntetycznymi substancjami wzrostowymi. **(Reduction of premature drop of apples by preharvest growth regulator sprays.)** [Russian and English summaries ¾ p. each.]
*Prace Inst. Sadown. Skierniewice*, 1955, **1**: 111-22, bibl. 20.

The effects of 2,4-D and NAA in reducing pre-harvest drop of apples were studied during 6 seasons in Poland. In all tests a considerable reduction in drop was obtained, but NAA gave slightly better results. Both materials were more effective at the higher concentrations used (0·001% to 0·005%). In one season, trees sprayed with 0·005% 2,4-D had the lowest drop, but in the following summer serious malformation and retarded development of the leaves was noted on Antonovka and Beauty of Croncels. The reduction in drop caused by the materials showed both varietal and seasonal variations. The results indicate that the best effect on pre-harvest drop may be obtained by applying 0·005% NAA 10–14 days before harvest, or 0·002% 2,4-D 14–20 days before harvest.

1132. Bosch, E., and Fritzsche, R.
Versuche zur Bekämpfung eines übermässigen Rötelbefalles an Kirschbäumen. **(Studies on control of a severe case of fruit drop in cherry trees.)**
*Schweiz. Z. Obst- u. Weinb.*, 1957, **66**: 64-8, bibl. 1, illus.

Poorly drained soil, N deficiency and stock-scion incompatibility are contributory causes of premature reddening and drop of cherries. The varieties Sammetkirsche and Basler Adler are highly susceptible even in

the absence of these factors. In a small-scale experiment the abnormality was almost entirely prevented by spraying with a preparation containing 98 p.p.m. α-naphthaleneacetic acid during flowering. The resulting slight curling of leaves was temporary. In an experiment on a larger scale the following year the same preparation, used as both spray and dust at concentrations of 50–190 p.p.m., was only slightly effective. Above 100 p.p.m. leaf curling was prolonged and at 98 p.p.m. it was much more severe than in the previous year. In untreated trees the fruit dropped markedly more from the side exposed to the weather than from the sheltered side.

1133. Bosch, E., and Fritzsche, R.
Versuche zur Bekämpfung eines übermässigen Rötelbefalles an Kirschbäumen. (Fortsetzung.) **(Studies on control of a severe case of fruit drop in cherry trees. Part 2.)**
*Schweiz. Z. Obst- u. Weinb.*, 1957, **66**: 84-90, illus.

[For Part 1 see previous abstract.] In vigorous young trees of several varieties a single spray application of 70–100 p.p.m. α-naphthylacetic acid immediately after flowering markedly reduced premature reddening and drop of fruit. Treatment was successfully combined with that against shot hole. Old or unhealthy trees responded uneconomically. Rolling of leaves resulting from treatment was extensive only in the variety Basler Adler, slight in most others and absent in some, including Sammetkirsche; all affected leaves recovered. Treated trees gave considerably higher yields with slightly smaller fruit size than untreated trees. Fruit flavour was unaffected and the spray was not harmful to human beings, animals or bees.

1134. Davison, R. M., and Farmer, A.
**Effect of hormone sprays on hastening maturity, yield, and size of apricots.**
*Orchard. N.Z.*, 1956, **29**(10): 29-31.

A progress report is given on experiments in which 2,4,5-T was applied at 50 and 100 p.p.m. to Oullin's Early apricots. Fruit maturity was advanced at both concentrations, but no significant increase in fruit size was apparent. Fruit drop was reduced. The treatment was more effective when applied at the beginning of stone hardening than when applied 36 days before harvesting. Serious damage occurred to the shoot tips only. Fruit spotting and cracking was occasionally caused by the sprays.—D.S.I.R., Auckland.

### *Pruning, training and thinning.*

(*See also* 1187d, j.)

1135. Bolzani, P.
Ricerche sulla potatura di produzione del pesco. Scelta dei rami piu produttivi. **(Pruning for peach production. Choice of branches.)**
*Ann. Fac. Agrar. Milano*, 1955, **4**: 283-300.

The author working with 3 peach varieties found that the capacity of secondary branches to bear is equal to that of primary branches in the strong growing variety, S. Anna di Balducci, but not in less vigorous ones such as J. H. Hale. He also found that vigorous 1-year-old fruiting shoots with a diameter of 7–15 mm. without any secondaries bore to maturity a larger number of fruits than less vigorous shoots of 4–7 mm. or 2–4 mm. Pruning should therefore aim at the production of the stronger shoots.

1136. Anon.
**Pruning tests with apples.**
*Fruit World, Melbourne*, 1956, **57**(11): 23.

Trials at Bathurst Experiment Farm (N.S.W.) were started in 1934 with Granny Smith on seedling stocks. Trees headed to 21 in. were most outstanding for fruit yield and tree growth. Moderately pruned trees had better fruit yields and tree growth than trees given extremes in pruning. Trees framework pruned by a modified system produced more fruit than those given the normal, hard framework pruning; tree vigour showed much variation within the treatments.

1137. Skalská, E.
Předběžné zhodnocení Ruzyňské palmety. **(Preliminary evaluation of the Ruzyně palmette.)** [Russian and German summaries 10 lines each.]
*Věd. Práce výzk. Úst. rostl. Výroby ČSAZV*, 1956, No. 2, pp. 53-67, illus.

The Ruzyně palmette is a combination of the Schlösser and Lepage palmettes and does not need a wire framework. One-year-old apples, preferably grafted on EM rootstocks, and pears on quince A are planted 1·5-2 m. apart in rows 3 m. apart. The second year following planting and after flowering all the branches are arched back and tied to similarly arched branches of neighbouring trees. Branches not long enough for this are tied to a lower branch or a stake. Apple and pear varieties are grouped according to their suitability for this method of training. Pears, especially late varieties, appear to respond better than apples.

1138. Harris, W. B.
**Pruning and manuring fig trees.**
*J. Dep. Agric. S. Aust.*, 1956, **60**: 129-30, illus.

A 10-year experiment on a plot of 30-year-old Smyrna figs showed that pruning was not an economic proposition since the 40% (dried weight) reduction in yield outweighed the benefit of the better quality fruit. N manuring (3 lb. sulphate of ammonia/tree/yr.) did not significantly affect yield or quality. J.R.L.

1139. (Higdon, R. J., and Grim, J. H.)
**The way to thin pears.**
*Agric. Res., Wash.*, 1956, **5**(6): 15.

A method of thinning Bartlett pears has increased the yield of large-sized fruit by one third. Defective and small fruits were removed, leaving about 1 pear per 50 leaves. It was found that fruit under-sized at thinning time rarely became large by harvest time.

### *Nutrition, manuring and soil management.*

1140. Vávra, M.
Možnost zmlazování ovocných dřevin bez řezu hnojením. **(Rejuvenating fruit trees without pruning by fertilizing.)** [Russian and German summaries ¼ p. each.]
*Acta Univ. Agric. Silvic., Brno, Ser. A*, 1956, No. 1, pp. 51-5, bibl. 9, illus.

Fertilizer applications to 12-year-old spindle bush apples at Lednice [Eisgrub] resulted in renewed growth. Of 4 treatments tested an organo-mineral mixture consisting of 35 quintals compost, 120 kg. granulated superphosphate and 60 kg. potassium sulphate per ha applied in April was found to be the best.

1141. Slesareva, E. I.
**Manuring of apples at planting.** [Russian.]
*Sad i Ogorod*, 1956, No. 10, pp. 52-4.

Of 8 treatments applied to 2 varieties of apple in Leningrad, the addition of 24 kg. humus plus 15 g. N, 30 g. P and 15 g. K to each planting hole had the most favourable effect on growth and yield.

1142. Gouère, —.
Dix années d'étude de la fumure azotée en culture intensive du pommier. **(A ten-year study of nitrogen fertilizing in intensive apple growing.)**
*Arboric. fruit.*, 1956, No. 33, pp. 5, 7.

Leaf analyses were made on Belle de Boskoop trees grown on poor soil at the Station Fruitière des Augères. During each summer, from June to October, there was a reduction in leaf contents of N and more particularly of $P_2O_5$ and $K_2O$, and an increase in C, CaO and MgO. Over the whole 10-year period there was a fall in N, $P_2O_5$, Ca and MgO and a rise in $K_2O$ and in the C/N ratio. The effects of increasing applications of N on leaf composition were an increase of N in both spring and autumn, depending on the amount supplied, a reduction of $P_2O_5$ at both seasons and little change in $K_2O$, except for a slight reduction at very high rates of N (3,000 and 3,750 g. of fertilizer per tree). The higher the N application, the greater was the uptake of both CaO and MgO, neither of which was included in the fertilizers. Carbohydrate formation was stimulated in spring, but slightly reduced in autumn, by increased N application. Total uptake of major nutrients remained practically constant, but total base uptake rose with increased N.

1143. Butijn, J.
Stikstofvoeding van fruitgewassen in de volle grond. **(Nitrogen nutrition of fruit crops in the open.)** [English summary ½ p.]
*Meded. Dir. Tuinb.*, 1956, **19**: 696-705, bibl. 22.

The use of leaf and soil analyses as a guide to the N nutrition of apple and pear is discussed. Results from previous literature and from experimental plots in Zeeland are included. It is concluded that advice for N manuring can best be based on the N content of leaf samples taken in July. Soil nitrate content would also be a good guide but is not easy to determine. Owing to the heavy N loss in wet winters by leaching only part of the N requirement should be given in the autumn.—Proefst. Fruit. Volle Grond, Wilhelminadorp.

1144. Morita, Y., and others.
**Studies on orchard soils. (I) (Physical conditions and soil management.) Part 1-3.** [Japanese, with English summaries pp. 8.]
*Bull. nat. Inst. agric. Sci. Hiratsuka, Ser. E*, 1955, No. 4, pp. 1-144, bibl. 133, illus.

*Part 1. Survey of orchard soils.* An extensive orchard survey, including peach and pear orchards, showed that where the trees were vigorous and productive the air space in the subsoil exceeded 10%. On some soils deep tillage proved very beneficial. Sawdust or straw mulch increased available P in the upper soil layer and exchangeable K at all depths.

*Part 2. Soil atmosphere and tree growth.* The effect of soil oxygen percentage was studied on the top and root growth of peach, pear, persimmon, apple and orange seedlings and vine cuttings in pots. In low oxygen concentrations good growth was made by persimmon, Satsuma orange, trifoliate orange and vine, medium growth by apple and Japanese pear, and poor growth by peach. [See also *H.A.*, 23: 199-201 and 3421.]

*Part 3. Soil moisture and tree growth.* The effect of soil moisture percentage was studied on top and root growth of peach, pear, persimmon, apple, chestnut, *Prunus mumé* and cherry seedlings, grafted peach trees, and vine and fig cuttings. In low soil moisture (25–45% water capacity) good growth was shown by vine, chestnut, peach, *Prunus mume* and cherry, medium growth by Japanese pear, apple and fig, and poor growth by persimmon. In high soil moisture (80–100% water capacity) good growth was shown by persimmon, chestnut, fig, peach and *Prunus mumé*, medium growth by apple, vine, persimmon and Japanese pear, and poor growth by cherry. Grafted peach trees reacted slightly earlier to moisture shortage than seedling peaches. [See also *H.A.*, 23: 202–204 and 3850.]

1145. Morita Y., and others.
**Studies on orchard soils. (II) (Physical conditions and soil management.) Part 4. Effects of orchard soil managements.** [Japanese, with English summary pp. 4.]
*Bull. nat. Inst. agric. Sci. Hiratsuka, Ser. E*, 1956, No. 5, pp. 65-162, bibl. 86, illus.

(1) Top and root growth of peach seedlings was best in deeply (100 cm.) cultivated plots into which manure had been incorporated, next best in deeply cultivated plots without manure and poorest in plots cultivated shallowly. The effects of the treatments on soil aeration and nutrient status are recorded. (2) Straw mulching and clean cultivation were compared on peach seedlings grown on sandy soil. Extension growth and top and root fresh weights were greater on the mulched trees. In the mulched soil roots were more abundant in the top 10 cm. layer and at a depth below 60 cm. than in clean cultivated soil. (3) Clean cultivation, straw mulching and cover cropping, each with and without fertilizer application, were compared for peach seedlings [see *H.A.*, 23: 2591]. (4) Cutting the surface roots of fruit trees developed under a straw mulch during subsequent cultivation did not result in reduced growth. (5) With Japanese chestnuts growth and yields were lower in sod plots than in plots under straw mulch, cover crops or clean cultivation. There were no significant differences between the other treatments.

1146. Hitz, C. W., Gilligan, G. M., and Amling, H.
**Effect of soil management practices upon soil and leaf analyses in a peach orchard.**
(*Tech.*) *Bull. Del. agric. Exp. Stat.* **316**, 1956, pp. 20, bibl. 12.

Results are given of a 10-year experiment in which 12

soil management treatments were tested in a peach orchard containing 3 different soil series. On all series the greatest organic carbon content of the soil was obtained by double cover cropping with rye-vetches in winter and soya beans in summer. The soil of all cover-crop treatments showed over 70% more K after 10 years than that from the plots under clean cultivation. Soil P was more dependent on P fertilizers supplied than on the cover crops. Generally the extremes of growth appeared to be closely related to the N, P and K levels in the soil. Leaf samples from trees fertilized with nitrate, poultry manure and other fertilizers under clean cultivation showed that their poor growth was probably due to unbalanced nutrition, particularly on the light soils. J.R.L.

1147. Włodek, J., Włodek, L., and Lenartowicz, W.
**Wpływ sciołkowania na zawartość składników pokarmowych w glebie i na jej wilgotność. (The effect of mulching on moisture content and nutrient elements in the soil.)** [Russian and English summaries ¾ p. each.]
*Prace Inst. Sadown. Skierniewice*, 1955, **1**: 81-109, bibl. 31.

Studies were carried out on mulches and mulched soils in apple and cherry orchards. Decomposing plant materials were found to lose mainly K during their decomposition. The water-holding capacity of partially-decayed plant matter seemed to be rather high. It was found that large amounts of K and organic compounds with a high C : N ratio dissolved out of the organic mulches into solution. Under straw mulch the amount of $K_2O$ and acid-soluble $P_2O_5$ increased in the soil, but the increase was not apparent under sphagnum peat or pine sawdust mulches. Soil moisture studies in 1 wet and 2 dry years showed that mulching markedly decreased the loss of soil moisture during drought periods. Peat and sawdust layers 20 cm. thick did not prevent rain penetration of the soil and the increase of soil moisture due to rain after dry periods was only slightly slower than in unmulched soils.

1148. Grasby, C. G.
**Cover cropping.**
*J. Dep. Agric. S. Aust.*, 1956, **60**: 44-5.

Clover has proved to be the most successful cover crop for orchards and vineyards in South Australia. Ploughing in early in the spring is necessary to obviate the risk of frost damage, but this reduces the amount of organic matter turned in and prevents re-seeding. A compromise programme of management is suggested. J.R.L.

1149. Ōgaki, C., Takeshita, S., and Mutō, T.
**Ecological investigations on peach trees on a black volcanic soil. No. 4. IV. Effects of sod treatment on the penetration of phosphorus and potassium in the Ando soil.** [Japanese, with English summary 10 lines.]
*Bull. Kanagawa agric. Exp. Stat. hort. Sect.*, 1956, No. 4, pp. 53-60, bibl. 8.

The growth of 5-year-old peach trees was reduced slightly by a grass sod which lowered the nitrate nitrogen of the soil in July to half that of clean cultivated soil and to one third that of soil under a mulch. The soil had a high coefficient of P absorption and P penetrated only 10–15 cm. during the 12 months following application, but in the same period K had penetrated to a depth of 120 cm. J.R.L.

1150. Toenjes, W., Higdon, R. J., and Kenworthy, A. L.
**Soil moisture used by orchard sods.**
*Quart. Bull. Mich. agric. Exp. Stat.*, 1956, **39**: 334-52, bibl. 8, illus.

Permanent sod covers of *Poa pratensis*, timothy, redtop and Chewing's fescue were moderate in water requirement, obtaining supplies mainly from the upper 24 inches of soil. Lucerne and ladino clover seriously depleted soil moisture to a depth of 40 inches and white clover used slightly less. Couch grass was intermediate in demands between the legumes and the other 4 grasses. June mowing in general conserved moisture under grasses and lucerne, but where soil moisture was abundant at or soon after mowing, a late-summer depletion followed, due to rapid regrowth, unless mowing was repeated.

1151. Kira, H.
**Interception of rainfall by the crown of a fruit-tree.** [English, with Japanese summary.]
*Tech. Bull. Kagawa agric. Coll.*, 1956, **7**: 207-12.

The author has calculated that during a rainstorn the aerial parts of an apple or peach tree will retain, on average, the equivalent of 0·8 mm. rain, which is subsequently evaporated and so never reaches the soil. Comparable figures for a grape vine are 1·2 mm. and for a pine tree 1·5 mm. Variations in retention due to season and other factors are discussed. J.R.L.

1152. Watanabe, T., Koto, M., and Kamata, H.
**The effect of soil moisture and potassium fertilizer on the leaf composition and growth of pear seedlings.** [Japanese, with English summary ¼ p.]
*Bull. Kanagawa agric. Exp. Stat. hort. Sect.*, 1956, No. 4, pp. 61-4, bibl. 13, illus.

Nagano's wild pear seedlings were grown in pots with the soil maintained at 15%, 30% and 60% soil moisture and potassium sulphate applied at the rate of 0, 2·5 and 5 g. per pot. The growth of seedlings was best at 30% soil moisture and poorest at 60%, and was poorer still when 5 g. $K_2SO_4$ was applied. Leaf N and P were highest when 2·5 g. $K_2SO_4$ was applied but K applications had no effect on leaf K. There was most N, P and K in the leaves of plants grown at 30% soil moisture and least in those grown at 60%. J.R.L.

1153. Patron, A., and Swinzow, H.
Influence de l'irrigation sur la composition chimique et l'appertisation des abricots Canino. **(The effect of irrigation on the chemical composition and suitability for canning of Canino apricots.)**
*Fruits d'Outre Mer*, 1956, **11**: 387-94, bibl. 3.

In the Marrakesh region the effect of irrigation on fruit maturity of apricots was studied. When irrigations were stopped more than a month before the first picking, ripening, although at first accelerated, stopped before completion. The resistance of the flesh to canning processes was improved, but fruit quality was

not. The ripening processes were delayed when irrigation was continued until just before picking. The optimum effect on fruit quality was obtained when irrigation was discontinued about 15 days before the first pick.

### *Composition of fruits.*

(*See also* 1015, 1084y, 1187u.)

1154. Schuphan, W.
**La valeur nutritive des fruits en rapport avec l'alimentation humaine. (The nutritive value of fruit in human diet.)**
*Arboric. fruit.*, 1956, No. 33, p. 13.
A brief summary of a paper, read at the 87th International Conference of the Société Pomologique de France, on biological assay of the nutrient value of different fruits carried out at the Bundesanstalt für Qualitätsforschung pflanzlicher Erzeugnisse at Geisenheim. [See also *H.A.*, 26: 4294c.]

1155. Hulme, A. C.
**Current methods for the study of the free amino acids in fruits.**
*Food Sci. Abstr.*, 1956, **28**: 345-62, bibl. 51, illus.
The ways in which new chromatographic methods have been applied to the investigation of the amino acid composition of fruits are reviewed, and detailed procedures for both qualitative and quantitative determinations, based largely on the author's work with the apple, are described.—Ditton Lab., D.S.I.R.

1156. Burroughs, L. F.
**1-aminocyclopropane-1-carboxylic acid: a new amino-acid in perry pears and cider apples.**
*Nature*, 1957, **179**: 360-1, bibl. 8, illus.
A previously unreported amino acid was discovered in perry and was identified as 1-aminocyclopropane-1-carboxylic acid. It was present in 17 out of 20 perry pear varieties studied but did not occur in Conference or William's. In a preliminary survey of rosaceous and other plants it was not detected in alcoholic extracts of gooseberry, currants, raspberry, loganberry, blackberry, strawberry, quince or medlar (green).—Long Ashton Res. Stat.

1157. Davenport, J. B.
**Studies in the natural coatings of apples. III. Saturated acids of the cuticle oil.**
*Aust. J. Chem.*, 1956, **9**: 416-19, from abstr. in *Abstr. publ. Paps C.S.I.R.O.*, 1956, **4**, No. 465.
Parts I and II [*H.A.*, 22: 2230 and 2231] described 4 fractions occurring in the natural coating of Granny Smith apples. The oil fraction is of particular interest because of its 3–4-fold increase in concentration during storage of the fruit. The first part of a detailed chemical investigation of the oil is described in the present paper. It was found that the unsaturated acids, comprising 10·3% of the cuticle oil of ripe Granny Smith apples, consist principally of stearic and arachidic acids, with smaller amounts of palmitic acid, behenic acid, and acids of higher molecular weight than behenic acid.

1158. Dickinson, D., and Gawler, J. H.
**The chemical constituents of Victoria plums: chrysanthemin, acid and pectin contents.**
*J. Sci. Food Agric.*, 1956, **7**: 699-705, bibl. 11.
Analytical methods have been evolved for the determination of chrysanthemin, malic acid and pectin in Victoria plums. Orthophosphoric and 3 chlorogenic acids were also detected.—Fruit Veg. Cann. quick Freez. Res. Ass., Chipping Campden. [For earlier work see *H.A.*, 25: 189.]

1159. Luckwill, L. C.
**Studies of fruit development in relation to plant hormones. IV. Acidic auxins and growth inhibitors in leaves and fruits of the apple.**
*J. hort. Sci.*, 1957, **32**: 18-33, bibl. 20.
Apple leaves and fruits are shown to contain 3 acidic growth-promoting and 2 acidic growth-inhibiting substances which appear to be different from any chemically known auxins or growth-inhibitors. By means of the technique of paper chromatography the distribution of these substances in fruits and seeds at different stages of development has been investigated. On the basis of the results so far obtained the possible significance of certain of these substances in fruit development is discussed. [Author's synopsis.]—Long Ashton Res. Stat. [For part III see *H.A.*, 26:3415.]

1160. Williams, A. J., Wallace, R. H., and Clark, D. S.
**Changes in the yeast population on Quebec apples during ripening.**
*Canad. J. Microbiol.*, 1956, **2**: 645-8, bibl. 5.
The numbers and species of yeasts occurring on Quebec apples were determined at two-week intervals during the ripening season. The numbers of yeasts decreased during August but increased in October. Ten species were isolated, of which *Candida malicola* and *Rhodotorula glutinis* var. *rubescens* were predominant. There was no evidence to show that rainfall was correlated with the numbers of yeasts on apples. [From authors' abstract.]

### *Packing and marketing.*

(*See also* 1187a, f, i, 2001.)

1161. Baudewijn, —.
**La part de l'emballage dans le prix de revient du fruit. (The part played by packing in the cost price of fruit.)**
*Arboric. fruit.*, 1956, No. 33, p. 8.
Packing costs are quoted for Belgian apples and pears at a central packing station and on the individual fruit farm. Possible means of reducing costs include the combination of packing with sorting.

1162. Rowe, G. A.
**Fruit carton forming costs cut.**
*Calif. Agric.*, 1957, **11**(1): 2, 15, illus.
By means of a simple alteration in design it has been found possible to cut by 50% the cost of labour needed to form telescopic fibreboard cartons. Originally developed for citrus packing houses, the improved

method may also be used in the volume-fill packing of deciduous fruits.

1163. Ritter, C. M., and Thomas, F. B.
**Comparative acceptance of packaged versus conventionally stored Stayman and Rome Beauty apples.**
*Progr. Rep. Pa agric. Exp. Stat.* **154**, 1956, pp. 2.
In a pilot trial flavour and texture comparisons were made between apples of both varieties which had been stored in bushel baskets for 10 weeks or which had been packaged in perforated and non-perforated 5-lb. polythene bags at intervals during the same period. Both lots were held at 35° F. The results suggest that these varieties can be pre-packaged at harvest time without loss of quality, and, in fact, a period of 10 weeks in bags resulted in better flavour and texture than did periods of under 6 weeks. No rot developed in any of the pre-packaged apples.

1164. Blanpied, G. D.
**Bruising of McIntosh apples in various shipping containers during a short truck haul.**
*Mimeo. Cornell Univ.* **GDB: 11**, 1956, pp. 4.
Eighteen types of packing containers were tested for the prevention of bruising of McIntosh apples during handling and a short truck haul. The best protection was given to apples packed in containers with layer pads between each layer of apples. Cell packs gave good protection, and most of the bruises were found on fruit next to the cell panels and ends.

1165. Sommer, N. F.
**Surface discoloration of pears.**
*Calif. Agric.*, 1957, **11**(1): 3-4, illus.
Tests have shown that a brown surface discoloration, a type of bruising which occurred in 1955 on Bartlett pears shipped from California to eastern markets in jumble-packed fibreboard cartons, can be effectively prevented by inserting compressed paper pads between the fruit and the carton lids. Other methods tested for preventing discoloration were less successful.

1166. French, B. C., Sammet, L. L., and Bressler, R. G.
**Economic efficiency in plant operations with special reference to the marketing of California pears.**
*Hilgardia*, 1956, **24**: 543-721, bibl. 66, illus.
A series of studies on marketing cost and efficiency for deciduous fruits has been undertaken by the California Agricultural Experiment Station and the United States Department of Agriculture. This publication is the first comprehensive technical research report on this work [see also *H.A.*, 22: 3459, 23: 259–262, 1568 and 2650–2652 and 26: 2503m]. It is concerned with the development of the appropriate theoretical framework for studies of plant costs and efficiency and with the research methods used in the empirical approach to these theoretical relationships. It then applies these methods to an analysis of the major functions or stages in fresh pear packing houses. Finally, stage relationships are synthesized into descriptions of short- and long-run cost functions under efficient operating conditions.

## *Storage.*

(*See also* 1068, 1074, 1187f, k, p.)

1167. Fidler, J. C.
**Modern trends in the storage of fruit and vegetables. III. Apples and pears.**
*Proc. Inst. Refrig., Lond.*, 1955, **51**: 173-85, from abstr. in *Food Sci. Abstr.*, 1956, **28**: No. 2334.
Trials in which Cox's Orange Pippin apples were stored in air or in 1 of 3 gas mixtures showed that, at the end of January, apples kept in atmospheres containing 3% $O_2$ and no $CO_2$ were as hard as those kept in atmospheres containing 5% $CO_2$+3% $O_2$. Apples stored in an atmosphere free from $CO_2$ were yellower than those in normal gas mixtures; after removal from store, they were kept at room temperature for at least 2 to 3 weeks without showing breakdown. Trials with Williams' pears showed that commercial storage life is about 6 weeks at 34° F., 7½ weeks at 32° F., 9 weeks at 31° F., 10 weeks at 30° F., and 12 weeks at 29° F. Conference pears could be stored for 12 weeks at 34° F., 18 weeks at 32° F., and about 24 weeks at 30° F. The humidity of cold stores needs consideration, e.g. Worcester Pearmain apples, which lose water very rapidly, cannot be stored under the conditions suitable for Bramley's Seedling apples.

1168. Fedołova, T. K.
**Reduction of storage losses in fruit.** [Russian.]
*Sad i Ogorod*, 1956, No. 10, pp. 64-5.
Small scale trials in Taškent with the 2 apple varieties Winter Gold Pearmain and Belyj naliv [Whitesap] showed that fruits from the upper branches had higher dry matter, sugar and vitamin C contents than those from the middle and lower branches. Fruits from the upper branches were also found to be less affected by storage rots than the others, and it is suggested that they should be picked, graded and stored separately and taken from storage last.

1169. Pastoriza, R., and Córdoba, O. G.
Temperaturas de congelaciòn de manzanas Deliciosa Colorada en el curso de su conservaciòn frigorìfica. (**Freezing temperatures of Red Delicious apples during cold storage.**)
*Rev. Invest. agríc. B. Aires*, 1956, **10**: 317-21, bibl. 4.
Samples of Red Delicious apples were taken at intervals during 8 months' storage at 0°–1° C. and 78–82% r.h. The average temperature required to freeze the fruit fell from −1·47° C. at time of harvest to −1·61° C. after 65 days' storage. After 122 days it had risen again to −1·52° C., but after 248 days it had fallen to −1·66° C. [For similar work on Rome Beauty see *H.A.*, 26: 1461.]

1170. Poma Treccani, C.
Fisiologia della maturazione in rapporto alla conservazione in frigorifero. Influenza dell'epoca di raccolta sulla conservazione e sui caratteri commerciali della mela Stayman Winesap. (Secondo contributo.)

**(Physiology of ripening in relation to cold storage. Effect of time of harvesting on storage and commercial qualities of Stayman Winesap apples. Part 2.)** [English summary ⅔ p.]
*Ann. Sper. agrar.*, 1956, **10**: 2117-42, bibl. 6.

The most satisfactory maturity test was that for starch content, but in general the pooled results of different tests were necessary in determining the optimum harvesting date. Features of harvested apples associated with optimal storage quality were: a large area of bright red with the green areas turning paler; starch no longer present in and near the core; easy removal from the spur; firmness of 15–16 lb. as indicated by the fruit pressure tester. Fruit harvested early retained high acidity and low sugar content, and was inferior in aroma and flavour. The later the harvesting the lower was the incidence of scald and bitter pit. [For part 1 see *H.A.*, 24: 2318.]

1171. JAMALAINEN, E. A.
Omenalajikkeiden varastoimiskokeet v. 1952–55. **(Storage experiments with apple varieties between 1952 and 1955.)** [English summary 14 lines.]
*Maatalous ja Koetoim.*, Part 10, 1956, pp. 174-84, bibl. 3.

Apple varieties stored at a temperature of 3°–6° C. are classified according to the time they lasted well in store. *Gloeosporium* did more damage than anything else. The extent of the damage due to different diseases or physiological disorders is tabulated. [From author's summary.]—Dep. Plant Path., Agric. Res. Centre, Tikkurila.

1172. PERRAUDIN, G.
Essais de conservation de la pomme Reinette du Canada. **(Storage tests with the apple Reinette du Canada.)**
*Rev. romande Agric. Vitic.*, 1957, **13**: 4-7, illus.

Samples of Reinette du Canada from 4 areas in Valais were given 4 different storage treatments and their behaviour was studied. Fruit from the Cône de Bramois was most suited to long storage. With natural storage immediately after picking evaporation losses were lowest and shrivelling was reduced. Yellowing of the fruits was favoured, in general, by stacking the fruit for 1 month before refrigerated storage.—Stat. fed. Essais agric., Lausanne.

1173. PFLUG, I. J., AND DEWEY, D. H.
**A theoretical relationship of the variables affecting the operation of controlled atmosphere storage rooms.**
*Quart. Bull. Mich. agric. Exp. Stat.*, 1956, **39**: 353-9, bibl. 2.

An equation has been derived to relate air leakage, respiration rate, room fullness, and equilibrium oxygen level for a controlled atmosphere [CA] storage room containing respiring fruit. The effects of the variables are illustrated graphically. It is believed that these relationships will aid in explaining the effects of temperature, small changes in room tightness, and degree of room fullness on the operation of the CA fruit storage. [Authors' summary.]

1174. NILSSON, F., AND OTHERS.
Kolsyrelagring av äpple och päron 1951–54. **(Carbon dioxide storage of apples and pears 1951-54.)** [English summary 1½ p.]
*J. roy. Swedish Acad. Agric.*, 1956, **95**: 319-47, bibl. 21, illus.

Detailed records are presented of extensive trials carried out for 3 seasons to compare the keeping quality of 4 apple and 4 pear varieties in ordinary refrigerated and in gas storage. Of the fungal diseases of apple, *Gloeosporium* rot did the greatest damage, which was severe in the controls, intermediate in cold storage and slight in gas storage. The development of blue mould (*Penicillium* sp.) and of grey mould (*Botrytis* sp.) was also much more effectively inhibited in gas than in cold storage. The absence of scald in both types of storage is attributed to effective ventilation. With both apples and pears, for which fewer data are recorded, gas storage was found to be economically advantageous in that it produced a much higher percentage of first-grade fruits and a lower percentage of waste. It was also shown that the benefits of gas storage can be reaped only if the fruits are harvested at the correct time. The authors note that it took 3–4 weeks for the $CO_2$ to reach the calculated proportion in the atmosphere of the chambers, about one-third of the gas being absorbed by the fruits during that period.—Swedish Fruit Storage Cttee, Helsingborg.

1175. RAKITIN, JU. V., KRYLOV, A. V., AND KOLESNIK, A. A.
**The gas regime of stored fruits and vegetables.** [Russian.]
*Priroda*, 1956, **45**(10): 97-9, illus.

The gas storage of fruit and vegetables is discussed, and an experiment is outlined in which apples, potatoes and carrots stored for a few days at 3–8° C. in an atmosphere containing 8% $CO_2$ with radioactive carbon were found to assimilate $CO_2$. Radioautographs of apple slices showed that the stem, calyx, skin, seed embryo, vascular bundles and adhering flesh contained the largest amount of $CO_2$. In carrots $CO_2$ accumulated in the rootneck, the tissues of the vascular bundles and the lower part of the root.

1176. BUCHLOH, G.
Der Einfluss der "Luftwäsche" auf die Lagerung von Äpfeln. **(The effect of "air washing" on apple storage.)**
*Angew. Bot.*, 1956, **30**: 169-84, bibl. 20.

"Air washing" is a method of removing ethylene from the atmosphere of a store by passing the air over water. Apple cool stores containing "air washing" systems were compared with normal cool stores, 4 apple varieties being stored at 4° C. In this experiment ethylene was not removed by "air washing", but it appeared to be less active at the low temperature. Other volatile aromatic compounds, however, were removed, and it was possible to keep the $CO_2$ concentration at a certain level. At the end of the experiment fruit from the "air-washed" stores had a much better appearance than that from a normal cool store. There appeared to be no acceleration of fruit ripening in spite of the presence of ethylene.—Inst. Obstb., Univ. Bonn.

1177. Buhler, D. R., Hansen, E., and Wang, C. H.
**Incorporation of ethylene into fruits.**
*Nature*, 1957, **179**: 48-9, bibl. 10.

Carbon-labelled ethylene was introduced into the atmosphere surrounding ripe avocado and green pear fruits, but uptake was small and was not improved in atmospheres of nitrogen or oxygen. Degradation studies were carried out on 2 organic acids isolated from these experiments. In tests with ripe oranges, limes, papayas, green apples, tomatoes and grapes no incorporation of ethylene was observed. The results indicate that ethylene is probably a terminal product of a sequence of metabolic processes in fruit and cannot be further metabolized. They also suggest that ethylene is probably synthesized by a route which is closely connected with organic acid metabolism.—Ore Sta. Coll., Corvallis.

1178. McGlasson, W. B.
**Some common storage disorders of apples and pears.**
*J. Dep. Agric. S. Aust.*, 1956, **60**: 207-19, bibl. 6, illus.

A series of coloured plates is presented on the following non-parasitic disorders of stored apples and pears in South Australia, together with notes on symptoms, varieties affected and control measures: *Apples:* Deep scald, low temperature breakdown, Jonathan spot, superficial scald in coloured varieties, sunburn scald, bitter pit, hollow-core breakdown, early watercore, and late or radial watercore. *Pears:* Core breakdown, skin scald, and freezing injury.

1179. Fidler, J. C.
**Scald and weather.**
*Food Sci. Abstr.*, 1956, **28**: 545-54, bibl. 12.

The physiological storage disorder of apples known as scald may occur in various forms, namely "rugose" scald, "browning" or "lenticel" scald. All forms can be controlled by wrapping the apples in oil-impregnated wraps. The various factors affecting incidence are discussed and investigations on one of these, the weather, are described. In studies over 10 years in Kent on Edward VII apples close correlations were found to exist between the amount of scald developing in storage and the total hours of sunshine (+0·92) and the total inches of rain (−0·98) during the period July 23 to Sept. 3. An even more highly significant correlation coefficient of 0·995 existed between scald and the difference between rainfall and potential transpiration during the same period. Contrary to experience elsewhere no such linear relationship was found between scald and mean temperatures during various stages of growth.—Ditton Lab., D.S.I.R.

1180. Keijer, E. J., and Dijksterhuis, H. P.
Bewaarziekten bij appels. De invloed van verschillende schurftbestrijdingsmiddelen. II. Het "spot" bij Jonathan. III. Scald bij Goudreinette en Notarisappel. **(Storage disorders of apples. The effect of some materials used for scab control. II. Jonathan spot. III. Scald on Belle de Boskoop and Notaris apples.)** [English summary ½ p.]
*Meded. Dir. Tuinb.*, 1956, **19**: 810-14, bibl. 1.

Two types of Jonathan spot have been identified, viz. "lenticel spot" and "storage spot". The occurrence of lenticel spot was greater after sulphur applications, while organic Hg sprays tended to increase storage spot occurrence. Time of spraying appeared to have some effect on the frequency of occurrence of both types of spot. Belle de Boskoop fruit showed much more scald in a common store than in cold storage, and this effect was more marked after TMTD sprays than after organic Hg or S applications. Red fruits had less scald than dull-skinned fruit. Two types of scald were apparent in Notaris apples, viz. stem and blossom-end scalds. A clear correlation was found between the occurrence of blossom-end scald and that of bitter pit. [For part I see *H.A.*, 26: 3510.]

1181. Ulrich, R., and Leblond, C.
Influence de divers emballages (papiers huilés, polythène) sur le comportement au froid des pommes Belle de Boskoop. **(Effect of various wrappings (oiled papers, polythene, etc.) on the behaviour of Belle de Boskoop apples in cold storage.)**
*Rev. gén. Froid*, Jan. 1955, repr. in *Arboric. fruit.*, 1956, No. 32, pp. 3, 5, bibl. 9.

Ripening was delayed for a month by advancing harvesting by a week. Apples in unoiled papers lost more weight than unwrapped controls, and developed the strongest scent and the highest percentage of scald. Heavily oiled paper shavings or wrappings also induced considerable scald. Polythene bags prevented ripening, but after 8 months' storage the apples ripened normally when the bags were removed and the fruit exposed to atmospheric temperature for 10 days. Scald was moderate in bags of 0·1 mm. thickness, but negligible in those half as thick. A small-scale experiment indicated that direct oiling of the apple skin by dipping prevented the normal colour change and induced browning of the tissues, an effect produced by all wrappings in proportion to their capacity for checking gaseous exchange.—Stat. exp. du Froid, Bellevue. C.N.R.S. [See also *H.A.*, 25: 1359.]

1182. Langerak, D. I.
Bewaring in plastic, de gasbewaring van de toekomst? **(Storage in plastic, the gas storage of the future?)**
*Fruitteelt*, 1957, **47**: 62-4, 66, illus.

Clapp's Favourite and Conference pears and Golden Delicious and Laxton's Superb apples were stored in polythene bags in boxes at low temperatures. Loss in fruit weight was nil after storage, but some weight loss occurred during after-ripening at 17° C., especially in opened bags. Carbon dioxide accumulated in the bags to a level too high for satisfactory pear storage. Fruit was firmer and juicier after storage and ripening in polythene bags than control fruits, but flavour and aroma were often poorer.—I.B.V.T., Wageningen.

1183. Almgren, K.
Vaxning av frukt och grönsaker. **(Skin coating of fruit and vegetables.)** [English summary ½ p.]
*J. roy. Swedish Acad. Agric.*, 1956, **95**: 275-318, bibl. 217.

This review of the literature discusses both general

problems of skin coating and the application of the technique to citrus fruits, bananas, dates, pineapples, melons, mangoes, apples, pears, cherries, grapes, tomatoes, cucumbers, carrots and other root crops. The chapter on apples and pears gives separate accounts of work done in the U.S.A., the British Commonwealth, Denmark, Holland, Switzerland and Germany.

1184. MONZINI, A., AND CORRÀ, F.
Contributi sperimentali alla conservazione delle ciliege. **(Investigations on the storage of cherries.)** [English summary 6 lines.]
*Ann. Sper. agrar.*, 1956, **10**: 1871-9, bibl. 4.
Cherries stored at 1° C. and R.H. 85–90% with ventilation at 1·2 m. per sec. were in good condition after 15 days, and where the normal atmosphere was modified to 10% carbon dioxide, 18% oxygen and 72% nitrogen the period was prolonged to 25 days. When the interval between harvesting and refrigeration was increased from 6 to 24 or 48 hours quality fell.

1185. SERINI, G.
Sulla natura degli zuccheri e degli acidi organici presenti nelle ciliege duracine nel corso della loro conservazione in ambiente refrigerato. **(The nature of the sugars and organic acids present in cling-stone cherries during cold storage.)** [English summary 6 lines.]
*Ann. Sper. agrar.*, 1956, **10**: 2039-43, bibl. 8, illus.
Determination of sugars and organic acids by paper chromatography is described. The only sugars present in mature cherries during 24 days' storage at 1° C. were glucose and fructose, the total content of which fell by 13% over the period. Malic acid was the only organic acid found among the 8 for which tests were made.

### *Dehydration.*

(*See also* 2008d, e.)

1186. ANON.
Il primo centro europeo per la disidratazione dei prodotti ortofrutticoli a Rovigo. **(The first European establishment for the dehydration of horticultural products at Rovigo [in northern Italy].)**
*Frutticoltura*, 1956, **18**: 545-8, illus.
A short note is given on the set up of the Puccinelli Packing Company's plant, an Italian-American venture which at present can dehydrate some 1,300 q. li [or rather more than 1 ton] of fresh material a day with a staff of 470, mainly women, used in 2 shifts. At the moment of writing apples and garlic are being treated and all the products are exported. The process is very briefly outlined.

### *Noted.*

1187.

a ANON.
Une calibreuse de fruits au poids de construction française. **(A French machine for sorting fruit by weight.)**
*Arboric. fruit.*, 1957, No. 35, p. 15, illus.

b BALDINI, E., AND SCARAMUZZI, F.
Frutticoltura e sperimentazione in Inghilterra. **(Fruitgrowing and experimental work in England.)**
*Riv. Ortoflorofruttic. ital.*, 1956, **40**: 449-82, illus.
A careful, useful account.

c BOWMAN, F. T.
**Chemical thinning of apples.**
*Fruit World, Melbourne*, 1956, **57**(9): 19-21.
Recommendations for use of NAA from 4-year trials.

d (BRANZANTI, E. C.)
Potatura verde del pesco. **(Summer pruning of peach trees.)**
*Riv. Fruttic.*, 1956, **18**: 471-2.

e BÜRGI, A.
Obstbauliches auf Briefmarken. **(Pomology on postage stamps.)**
*Schweiz. Z. Obst- u. Weinb.*, 1957, **66**: 4-8, illus.

f CRANDALL, P. C.
**Bartlett pear handling and storage for the cannery.**
*Stats Circ. Wash. St. agric. Exp. Stats* **292**, 1956, 1 folded sheet.
Notes on maturity testing, storage and ripening.

g FORSHAW, J. E.
**The dwarf pyramid apple tree.**
*Agriculture, Lond.*, 1956, **63**: 373-7.
Establishment, management and causes of occasional failure.

h KALLIO, T. K.
Suomessa viljeltyjen omenapuulajikkeiden pölytyssuhteista. **(Pollination experiments on apple varieties cultivated in Finland.)** [English summary 12 lines.]
*Maatalous ja Koetoim.*, Part 10, 1956, pp. 65-73, illus.
Observations on 18 varieties in the years 1953–55.—Hort. Coll. Lepaa.

i LEVIN, J. H., AND GASTON, H. P.
**Grower handling of red cherries.**
*Circ. U.S. Dep. Agric.* **981**, 1956, pp. 20, bibl. 3, illus.
In lugs, by hand or by forklift trucks, and using water transport. [See also *H.A.*, 26: 3408h.]

j LOUIS, A.
Choix des variétés fruitières en fonction des formes. **(Choice of fruit tree varieties for shaping.)**
*Jardins Fr.*, 1956, **2**: 222-4, illus.
Apple and pear varieties suitable for training according to different systems are listed.

k MAJSTOROVIĆ, G.
Izbor skladišta za čuvanje plodova jabuka. **(Choice of type of store for apples.)** [French summary ½ p.]
*Bilj. Proizv.*, 1956, **9**: 147-60, bibl. 11, illus.
A plea for the use of surface stores rather than dugouts or cellars for normal storage of apples.

l NANKIVELL, W. I.
**Pollination for deciduous trees.**
*Fruit World, Melbourne*, 1956, **57**(8): 9.
Pollination groups are given for apples, pears, plums, peaches and grapes.

m RAUTAVAARA, T.
Hedelmä- ja marjataloutemme rakenteesta. **(The fruit industry in Finland.)** [English summary ½ p.]
*Maatalous ja Koetoim.*, Part 10, 1956, pp. 196-208, bibl. 1.
—Res. Bureau, Hort. Ass., Helsinki.

n REBOUR, H.
Suppression progressive des arbres intercalaires dans les vergers. **(Progressive removal of filler trees in orchards.)**
*Fruits et Prim.*, 1956, **26**: 321-3, illus.
Plans for deciduous fruit and citrus plantations.

o SCARAMUZZI, F.
Contributo allo studio dell'influenza esercitata dalle foglie del soggetto nella disaffinità d'innesto del pero Kaiser su cotogno. **(Contribution to the study of the influence exerted by the leaves of the rootstock on the incompatibility of Kaiser pear grafts on quince.)** [English summary ½ p.]
*Riv. Ortoflorofruttic. ital.*, 1956, **40**: 403-13, bibl. 24, illus.
Allowing quince rootstocks to develop leafy shoots did not reduce the incompatibility between them and Kaiser pear scions.

p SCHNEIDER, G. W.
**Hydrocooling peaches.**
*Amer. Fruit Gr*, 1956, **76**(8): 12, illus.
Economic aspects.

q TOLL JUBÉS, J. G., OSTE, C. A., AND ARAMAYO, H. S.
Informe preliminar sobre el comportamiento de algunas variedades de ciruelos y durazneros en la Estación Experimental Agrícola de Tucumán. **(Preliminary note on the behaviour of some plum and peach varieties at the Tucumán Agricultural Experiment Station.)**
*Rev. industr. agríc. Tucumán*, 1955, **39**: 63-5.

r VAN ROECHOUDT, L. L.
**Dwarf apples in Northwest.**
*Fruit Var. hort. Dig.*, 1956, **11**: 26.
M.IX, VII and II promising as hardy stocks in Okanagan.

s WELKERLING, E. M. L.
Problemas de auto-incompatibilidad sexual en variedades de almendro y damasco. **(Problems of sexual self-incompatibility in varieties of almond and damson.)**
*Rev. Fac. Cien. agrar.*, 1954, **4**(1): 35-9 [received 1957].
Of the 12 almond varieties studied all proved self-incompatible, but 17 of the 18 damson varieties were self-compatible.

t WELKERLING, E. M. L.
Algunos aspectos de la fruticultura europea. **(Some aspects of fruit growing in Europe.)**
*Idia*, 1956, No. 103, pp. 1-13, bibl. 3, illus.
Work of research institutions in England, Scotland, Belgium, Switzerland and Italy.

u ZALEWSKI, W.
Próba ustalenia gatunków i odmian owoców na podstawie chromatograficznego oznaczania barwników. **(Tests on the identification of fruit species and fruit varieties on the basis of chromatographic analysis.)** [Russian and German summaries 7–9 lines.]
*Prace Inst. Sadown. Skierniewice*, 1955, **1**: 157-68, bibl. 12, illus.
With fruits of strawberries, cherries and plums.

## SMALL FRUITS, VINES AND NUTS.

### *Small fruits.*

(*See also* 1016, 1018, 1030, 1067, 1187u, 1240b, c, f, s, w, 1585c, 2000, 2008b.)

1188. WILHELMINADORP.
*Jaarverslag 1955, Proefstation voor de Fruitteelt in de Volle Grond, Wilhelminadorp (bij Goes).* **(Annual Report 1955 of the Experiment Station for Fruit-growing in the Open, Wilhelminadorp (near Goes)),** 1956, pp. 71, illus. [English summaries.]
A new experimental farm has been established at Kapelle for small fruit; trials have been started with black and red currants, raspberries, blackberries and strawberries. At Goes studies with top fruit have been continued, including those on soil water management, physiological aspects of leaf-fall and growth substance production, studies on apple and pear scab, and apple mildew, mite and insect pests, wind protection for orchards, and ecological studies.

1189. BRITTON, D. M., AND HULL, J. W.
**Mitotic instability in blackberry seedlings from progenies of Boysen and of Young.**
*J. Hered.*, 1956, **47**: 205-10, bibl. 18, illus.
Crosses between Boysen and Young blackberries, both heptaploids, and the tetraploid variety Eldorado gave rise to seedlings, some of which were mitotically unstable. These unstable plants were vigorous and phenotypically indistinguishable from normal hybrids. One of these unstable progeny was multiplied vegetatively by rooting leaf-bud cuttings in coarse sand under constant mist. Six plants raised in this way still exhibited mitotic instability but each had a predominant chromosome number which differed from that of the others.—Md agric. Exp. Stat.

1190. Bogdański, K., Zalewski, W., and Bogdańska, H.
Studium nad zawartością kwasu l'askorbinowego . . . **(Studies on the ascorbic acid content, colour and certain other components and properties of black currant varieties.)** [English summary 15 lines.]
*Roczn. Nauk rol.*, 1956, **73**: 143-4.

The analyses are given of the fruit of 9 black currant varieties including Goliath, Boskoop Giant, Bang Up and Victoria as affecting their commercial value. Acidity varied between 537 and 669 m.eq., pectin content between 0·69 and 3·15%, thickness of skin between 9 and 30 microns, cuticle thickness between 4 and 16 microns. The average weight of seeds varied from 1·01 to 1·41 mg. or 0·91 to 1·30 mg. according to method of drying. The average ascorbic acid content was 168·7 mg. %. Colour was determined on a chromatographic column. Observations were also recorded on strength of attachment to strig.

1191. Sorge, P.
Rote Spätlese. **(The red currant variety Rote Spätlese.)**
*Neue dtsch. Obstb.*, 1956, **2**(2): 21, 29, from abstr. in *Beerenobstschrifttum*, 1956, No. 5, p. 11.

The merits of Rote Spätlese shown by comparative trials include: very high yields from the fourth year onwards, resistance to spring frost and easy picking. The fruit is suitable for processing.

1192. Dalbro, K., and Dullum, N.
Gødningsforsøg med ribs. **(Manurial trials with red currants.)** [English summary 1 p.]
*Tidsskr. Planteavl*, 1957, **60**: 721-8.

Annual red currant yields over the period 1949–56 of 65, 104, 124, 151 kg./100 sq. m. corresponded to the following applications of calcium nitrate: 0, 300, 600, 900 kg./hectare per year. Annual applications of 20 tons stable manure per hectare or of the equivalent amounts of N, P, K in artificial fertilizers produced yields of 95 kg. and 124 kg. per year respectively. The inferior results obtained with manure are thought to be due to loss of nitrogen, although the manure was ploughed in immediately. The trials were carried out at Blangstedgaard on a heavy loam soil well provided with P and K.

1193. Johnston, S.
**Blueberry breeding in Michigan.**
*Fruit Var. hort. Dig.*, 1956, **11**: 20.

Early attempts to produce a hybrid blueberry for northern Michigan, which combined the desirable qualities of the highbush blueberry with the short growing season of the lowbush, were unsuccessful. Recently selections have been made which possess these characteristics, and, in addition, are drought resistant and sufficiently dwarfed to be protected by snow in winter.—S. Haven Exp. Stat., Mich. St. Univ.

1194. Roelofsen, B.
Enkele voorlopige resultaten van de teelt van blauwe bessen, *Vaccinium corymbosum*. **(Some preliminary results from growing blueberries.)**
*Fruitteelt*, 1957, **47**: 78-9, illus.

Growth and yields of 7 American and 2 German varieties are being compared in a cultural experiment in Holland.

1195. Fernqvist, I.
Sortförsök med hallon i Norrland. **(Varietal trials with raspberries in Norrland [Sweden].)** [English and Esperanto summaries ½ p. each.]
*Meddel. Trädgårdsförs. Malmö* **99**, 1956, pp. 25, bibl. 11, illus.

Trials were carried out in 6 localities with different climatic conditions. The hardiest varieties were Asker, Marlboro, Miranda and the low-growing Hornet. The earliest harvest was given by Marlborough.

1196. Hårdh, J. E.
Versotaudin ja punkkien esiintyminen vadelmalajikkeissa. **(The incidence of spur blight and mites on some red raspberry varieties.)** [English summary 10 lines.]
*Maatalous ja Koetoim.*, Part 10, 1956, pp. 131-5, bibl. 5, illus.

Among 24 varieties under observation were Lloyd George, Preussen, Marlboro, Pynes Royal, and St. Walfried. Preussen and Pynes Royal were only slightly infected with *Didymella applanata* and were not attacked by mites (*Eriophyes* and *Tetranychus* spp.). [From author's summary.]—Dep. Pl. Path., agric. Res. Centre, Tikkurila.

1197. Tinsley, I. J., Sidwell, A. P., and Cain, R. F.
**Methods of presenting raspberry and strawberry samples to the Hunter Colour and Colour-Difference Meter.**
*Food Tech.*, 1956, **10**: 339-44, from abstr. in *Food Sci. Abstr.*, 1956, **28**, No. 2422.

Measurements of colour by the Hunter Colour Meter were made on fresh and frozen strawberries and raspberries (1) by computing the arithmetic mean of a series of readings made on the samples in the usual way (2) by readings on samples rotated above the window of the instrument, (3) by readings on samples after blending in a Waring blendor for 30 seconds, and deaeration for 15 minutes. Readings by methods (1) and (2) were highly correlated; agreement was nearest when the rate of rotation was 80 to 100 rev./min. Readings by method (3) were less highly correlated.

1198. Miller, P. W., and Waldo, G. F.
**Relative resistance of some strawberry varieties and selections to powdery mildew at Corvallis, Oregon.**
*Plant Dis. Reptr*, 1957, **41**: 23-4, bibl. 4.

For 3 years the plants in strawberry varietal field trials have been assessed for their mildew (*Sphaerotheca macularis*) resistance. Of the 43 varieties under observation Siletz, Sparkle, Indra, Puget Beauty and U.S.—Oreg. selections 2249, 2312, 2319, 2326 and 2328 showed a high degree of resistance. Many of these are derived from *Fragaria chiloensis*.—Ore. agric. Exp. Stat. and U.S.D.A.

J.R.L.

1199. Yokomizo, T., and Takahashi, K.
**Studies on strawberry forcing. No. IV. The ripening season and early cropping of plants grown on a cool plateau.** [Japanese, with English summary ¼ p.]
*Bull. Kanagawa agric. Exp. Stat. hort. Sect.*, 1956, No. 4, pp. 83-8, bibl. 4.
Strawberry runners of the variety Fukuba planted on a cool plateau, 650 m. high, in early July and transferred to forcing beds in late September or early October, had fewer leaves than those grown on warmer sites at lower altitudes; but 3 years' records show that they cropped more than 10 days earlier and yielded better, although in some seasons the fruits were a little smaller. [For I and II see *H.A.*, 25: 234 and for III see *H.A.*, 26: 279.] J.R.L.

1200. Norton, R. A.
**Nutrition of the strawberry (*Fragaria* spp.) with special reference to foliar absorption of radiophosphorus and calcium.**
*Diss. Abstr.*, 1956, **16**: 1036, being *Publ.* 16,743 of 153 pp.
Foliage and root applications of radiocalcium and radiophosphorus were given to Robinson strawberry plants grown in sand culture. It was shown that $P^{32}$ was readily translocated from foliar and root applications to non-treated parts, especially to developing leaves, fruits, root tips and runner plants. Translocation of $Ca^{45}$ from foliar applications was negligible; from root applications $Ca^{45}$ was readily absorbed and translocated to all plant parts including runners, but there was little movement into the roots of attached runner plants. The uptake of $P^{32}$ from the leaves was less affected by the phosphate level at which the plants were grown than was absorption from the roots. The rate of foliar uptake of 3 nitrogen-phosphorus carriers was studied using radiophosphorus, and the phosphoric acid-urea combination was found to be the most readily absorbed and utilized. Dry weight production by leaves was greatly reduced as root temperature decreased from 75° to 45° F., while dry weight of roots was reduced very little. A highly significant reduction in $P^{32}$ uptake by roots occurred with a reduction in temperature from 55° to 45° F., while absorption and translocation of foliar-applied $P^{32}$ appeared to be less influenced by the temperature of the root medium. In limited field trials in Michigan pre-blossom and post-blossom applications of several fertilizers were given to Robinson and Premier plantations. The applications were beneficial in only one case, namely where the soil fertilization was inadequate.—Mich. St. Univ.

1201. (Roberts, A. N., and others.)
**Fir sawdust mulch increases yield of strawberries.**
*Bett. Fruit*, 1956, **51**(5): 5-6, illus.
Experiments at Oregon State College showed that sawdust mulch was better than mulches of oak leaves or straw or than clean cultivation for blueberries, but that clean cultivation gave better results than mulching on raspberries. On strawberries a 4-in. mulch of fir sawdust gave higher yields than fir or alder sawdust incorporated in the soil or than clean cultivation. Incorporation of fir sawdust did not significantly increase yields. Red stele disease was increased by sawdust mulching and by N application.

1202. Fulton, R. H., and Zollar, C. O.
**Screenhouses for propagating virus-free foundation stocks of strawberries.**
*Down to Earth*, 1956, **12**(3): 10-11, bibl. 2, illus.
Virus-free mother plants of the strawberry varieties Catskill and Robinson were grown in a house screened with plastic and in adjoining land in the open. Both areas were fumigated with Dowfume W-85 at 9 gal./acre and in addition the soil in the screenhouse was refumigated with Dowfume MC-2 at 2 lb./100 sq. ft. The need for weeding was largely eliminated in the screenhouse, and the screened plants were more vigorous and produced more runners than those in the open. Suggestions are made on the siting and operation of screenhouses for the production of strawberry foundation stock.—Mich. St. Univ., E. Lansing.

1203. (Brekke, J. E., and others.)
**Making hallocks last longer.**
*Agric. Res. Wash.*, 1956, **5**(4): 15.
Berry picking boxes of thin wood were efficiently protected from mould growth by treatment with sodium orthophenyl phenate.

## *Vines.*

(*See also* 1008, 1043, 1084q, 1087, 1103, 1148, 1183, 1240a, d, e, g-m, o, q, r, t, u, 1424, 1596, 1865, 1967, 1986, 2008f.)

1204. La Hulpe.
*Station provinciale des Recherches Scientifiques en Viticulture, à La Hulpe. Rapport annuel de 1955.* **(La Hulpe Viticultural Research Station, Annual Report for 1955)**, [1956], mimeo., pp. 115.
Reports are given of the results obtained in 1955 from work in progress. *Hybridization:* aimed at obtaining a grape with a large fruit which would compete with Cannon Hall or Royal. *Improving fruit set:* treatment of the inflorescences by stimulatory vapours, additional light, or I.R. and U.V. treatment of the pollen grains. *Armillariella mellea:* biological study, and effect of different environments; control in the glasshouse. *Root systems:* development as affected by various substrata. *Cold storage:* fruit storage in cidathene bags gave the best results. *Control:* of red spider and *Botrytis*. *Photoperiod for tomatoes:* yields were earliest after a photoperiod of 13 hours.

1205. Gazzari, A., and Rumora, L.
Prilog poznavanju vrijednosti Dalmatinskih sorata vinove loze. **(An evaluation of Dalmatian vine varieties.)** [German summary ⅓ p.]
*Bilj. Proizv.*, 1956, **9**: 135-46, bibl. 14.
Results are given of the analyses of the musts of 33 vine varieties from different districts in Dalmatia.

1206. Schad, C., and Dupoux, A.
Résultats de l'expérimentation sur les hybrides producteurs de vigne pour la période de 1946 à 1953. **(Results of trials with direct-producer hybrid vines during the period 1946-1953.)** [English, German and Russian summaries ⅓ p. each.]
*Ann. Amél. Plantes*, 1956, **6**: 239-79.

Numerous hybrids were tested, direct and grafted, on calcareous and non-calcareous clay soils. Data tabulated for the 33 best varieties concern wine colour, dates of flowering and ripening, vigour, mildew resistance of leaves and grapes, productivity and wine quality.

1207. Zuluaga, P. A., and Gargiulo, A.
Poliploidia en *Vitis vinifera* L. **(Polyploidy in *Vitis vinifera.)*** [English summary 5 lines.]
*Rev. Fac. Cien. agrar.*, 1954, **4**(2): 1-13, bibl. 15, illus.

A tetraploid variety was obtained by treating newly formed buds of Malbeck (Cot Rouge) vines with injections of 0·1–0·3% colchicine in 5% pure glycerine. The treated shoots were defoliated and bent down to stimulate bud development, and later the buds were grafted on to vigorous stocks of other varieties. The new tetraploid showed high vigour, large grapes and deep fruit colour than the parent.

1208. Hale, C. R., and Jones, L. T.
**The pollination of Ohanez grapes.**
*J. Agric. W. Aust.*, 1956, **5**: 565-7, illus.

Experiments carried out in the 1955-56 season showed that the life of pollen in pollen-water sprays was limited. Black Malaga pollen was effective for at least 3 hours but Muscat pollen apparently lost its effectiveness even more rapidly. [From authors' summary.]

1209. Wellington, R.
**Artificial pollination of the Eumelan grape.**
*Fruit Var. hort. Dig.*, 1956, **11**: 21-2.

The failure of Eumelan, an otherwise excellent table and vine grape, to produce fertile pollen makes its cropping uncertain. In 1955 pollen was collected from *Vitis riparia* vines and several French rootstocks, and, mixed with flour in the proportion 1 : 19, was applied by dusters to vigorous Eumelan vines, which had given poor crops despite the proximity of good pollinators. The treated vines yielded an average of 18·5 lb. grapes compared with 9 lb. from untreated vines. Elsewhere a few exceptionally vigorous vines hand-pollinated with pure pollen yielded 49 lb. per vine compared with 18 lb. from untreated vines.—N.Y. St. agric. Exp. Stat., Geneva.

1210. Schanderl, H.
Untersuchungen über die Geschwindigkeit des Transpirationsstromes in den jüngsten Gefässen der Reben. **(Studies on the velocity of the transpiration stream in the youngest vessels of vine tissues.** [English, French, Spanish summaries, about 6 lines each.]
*Mitt. Klosterneuburg, Ser. A*, 1956, **6**: 269-86, bibl. 5, illus.

On hot summer days the velocity of the transpiration stream in vines, measured thermo-electrically, was found to reach values of 9 m/hour in the vineyard and of 12 m/hour in American rootstock vines with a large leaf area or in European vines trained on walls. The highest speeds were always recorded in the main stem just above soil level, the factors most affecting the speed of the stream being intensity of solar radiation, leaf area and, in a negative sense, soil moisture deficits. Varietal differences between American vines were not apparent, but in relation to unit of leaf area the transpiration stream was faster in European than in American vines. According to L. Wienke (*Planta*, 1940, 31: 22-31) the velocity also depends on the content of electrolytes, especially potassium, in the soil water. The investigation was carried out at Geisenheim in the summers of 1937 and 1938.

1211. Flerov, A. F., and Agulova, V. K.
**The effect of light on the anatomical structure of the vine.** [Russian.]
*Doklady Akad. Nauk S.S.S.R.*, 1956, **110**: 1120-1, illus.

When 1-year-old vine shoots, still attached to the plant, were wrapped in foil and black paper to exclude light for a whole season, their anatomical structure changed from that of a normal stem to that of one resembling a root. The function of the shoots grown in the dark also appeared to be modified; they had an unusually high starch content.

1212. Breviglieri, N.
Ricerche sui sistemi radicali della vite. **(Investigations on vine root growth.)**
*Atti Accad. ital. Vite 1955*, 1956, **7**: 93-153, bibl. 39, illus.

A comprehensive account of a great labour undertaken in Tuscany and in the valley of the Po in which the author examined the root systems of *Vitis vinifera sativa*, of American vine rootstocks worked with *V. vinifera*, of trees forming living supports to vines and of the wild vine *Vitis silvestris*. His observations, backed by 37 very clear photographs or graphs showing marked variations according to vine and environment, are here set out and should surely be a model for anyone wanting to investigate vine rootgrowth elsewhere.

1213. Branzanti, E. C.
La fine delle alberate. **(The artificial supplants the living trellis for vines.)**
*Frutticoltura*, 1956, **18**: 548-54, illus.

Among reasons why metal or wooden supports are now preferred for trellised vines instead of living elms and poplars are the following: the living support is a competitor for nutrients, it takes up excessive room, it restricts light, it harbours diseases and pests and makes their control more difficult, it is more exacting as regards cultivation and this in turn damages the American rootstocks now necessary.

1214. Scaramella Petri, P.
Attecchimento di talee in ibridi di vite di difficile radicazione. **(Rooting of cuttings in vine hybrids noted for difficulty of rooting.)**
*Nuovo G. bot. ital.*, 1953, **60**: 694-6, illus. [received 1957].

Cuttings of the hybrids Berlandieri × Riparia 420A and Berlandieri × Rupestris 1737, notably difficult to root, all developed roots after 7 days' treatment with 0·1% aqueous rabbit bile followed by storage in moist sand for 40 days. Surface cuts had been made near the two lowest nodes, hence the rooting may have been

a response to the combined stimuli of bile and mechanical injury. [For further developments in use of bile see *H.A.*, 27: 33.]

1215. Bosian, G.
Der heutige Stand der Holzreife- und Affinitätsforschung im Weinbau. **(The present position of wood maturity and compatibility research in viticulture.)**
Reprinted from *Weinberg u. Keller*, 1956, **3**: 64-72, bibl. 19.

A discussion on wood maturity in vines shows that methods for its assessment are now available, but that we have as little fundamental knowledge of the physiological conditions underlying it as we have about the affinity or compatibility between rootstock and scion. In view of the fact that the take in grafted vines does not exceed 40–50% and that the life of grafted vines is shortened to about 25 years, the problem of compatibility is of great practical importance. The author of this review suggests a biochemical approach to the problem.

1216. Zahanova, E. I., and Basan'ko, A. A.
**Characteristics of the development of grafted and own-rooted vines.** [Russian.]
*Agrobiologija*, 1956, No. 4, pp. 78-83.

In experiments at Novočerkassk, Rostov region, European vine varieties grafted on frost resistant European-Amurian hybrid and Bujtur rootstocks performed much better than those grown on their own roots. Soil moisture utilization, assimilation, transpiration, dry matter accumulation and consequently growth and fruiting were better in the grafted vines. The frost resistant root system also appeared to improve drought resistance.

1217. Buxbaum, W.
Erfahrungen mit Unterlagsreben. **(Observations on vine rootstocks.)**
*Weinblatt*, 1956, **51**: 797, from abstr. in *Mitt. Klosterneuburg, Ser. A*, 1957, **7**: 55.

Trials with phylloxera-resistant vine rootstocks, carried out in the Rhine area for over 25 years, led to the recommendation of 6 rootstocks. Their characteristics, such as moisture requirements, lime tolerance and root system, are discussed.

1218. Rao, U. N., and Muthuswamy, S.
**A note on inter-generic grafting between *Tetrastigma lanceolarium* Planch and *Vitis vinifera* L.**
*South Indian Hort.*, 1956, **4**: 28-9, bibl. 3, illus.

Limited success has been obtained at Coimbatore with side grafting vine scions on to rootstocks of *Tetrastigma lanceolarium*, in an attempt to extend the range of viticulture in South India.

1219. Nyrkov, N. V., and Artamonov, N. V.
**Mechanization of vine planting.** [Russian.]
*Vinodelie i Vinogradarstvo*, 1956, No. 6, pp. 54-6, illus.

An illustrated description is given of a tractor-drawn trailer with a ploughshare adapted for planting vines. With the aid of the implement 4 men can plant 8 ha. per day.

1220. Dupuis, H.
Pflugarbeit bei grossen Zeilenabständen. **(Ploughing vineyards with widely spaced rows.)**
*Dtsch. Weinb.*, 1956, **11**: 297, from abstr. in *Mitt. Klosterneuburg, Ser. A*, 1957, **7**: 50-1.

Work in the vineyard is described with a new model of plough designed to earth up both inner sides of widely spaced vine rows (140–150 cm. apart) at the same time. The plough was developed at the Inst. landw. Arbeitswiss. u. Landtech., Bad Kreuznach, Germany.

1221. Weiss, J.
Ein Versuch zur Verbesserung der Rebenerziehung. **(Experiments aiming at the improvement of vine training.)**
*Dtsch. Weinb.*, 1956, **11**: 179, from abstr. in *Mitt. Klosterneuburg, Ser. A*, 1957, **7**: 51.

Results of experiments are reported which were carried out during the first 3 cropping years of a vineyard planted in 1951. The recommendations are: Train one stem (not two) to a height of 0·70 m. (not 0·50 m.); if possible, form the stem in the second year (not later); plant at distances of 1·10–1·30 m. in the row and of 1·40–1·50 m. between the rows.

1222. Peyer, E.
Der Rebschnitt 1957. **(Vine pruning in 1957.)**
*Schweiz. Z. Obst- u. Weinb.*, 1957, **66**: 61-4, illus.

Advice is given on pruning of Swiss vines to compensate for poor growth resulting from a severe winter and an unfavourable summer. Where sufficient fruiting wood is available 3 shoots should be left each with 4 buds instead of the usual 2, and where only basal shoots have grown one should be arched, another cut back to 5–6 buds and the rest removed.

1223. Klenk, E.
Zehnjährige Erfahrungen mit Müllkompost im Weinbau. **(Ten years' observations on the application of town waste to vineyards.)**
*Dtsch. Weinb.*, 1956, **11**: 355, from abstr. in *Mitt. Klosterneuburg, Ser. A*, 1957, **7**: 51-2.

The author obtained good results from the application to vines of compost prepared from town waste with certain specified additions. The town waste was collected in summer when rich in organic materials.

1224. Knickmann, E.
Zur Frage der Nährstoffverluste in Weinbergsböden durch Auswaschung. **(On the leaching of nutrients from vineyard soils.)** [English, French, Spanish summaries 7–8 lines each.]
*Mitt. Klosterneuburg, Ser. A*, 1957, **7**: 15-21, bibl. 11.

The widespread incidence of premature autumn-colouring in vineyards after the rainy summer of 1956 suggested the possibility that the phenomenon was a symptom of N deficiency caused by leaching. However, calculations based on data from earlier lysimeter and soil profile studies by other authors show that even

in wet summers no excess of soil moisture and therefore no leaching occurs in typical vineyard locations. In the winter, on the other hand, leaching is likely to occur and figures are presented for the estimated loss of N.

1225. Lužeckij, S. N.
**Foliar nutrition with phosphorus mixed with bordeaux.** [Russian.]
*Vinodelie i Vinogradarstvo*, 1956, No. 7, pp. 35-9, bibl. 11.
The effect of bordeaux mixture or a neutraliser on the assimilation of P by vine leaves is discussed. In experiments at the Timirjazev Academy of Agriculture, Moscow, from foliar applications of a 5% solution of $P^{32}$ labelled superphosphate 50·6% P was assimilated by the leaves, but from a similar solution neutralized with milk of lime 3·5%, and, when 1% bordeaux was added to the solution, only 1·5% P was assimilated. This confirms the findings of other workers that very much more P enters the leaves from sodium and ammonium diphosphates in acid than in neutral solutions.

1226. Hewitt, W. B., and Gardner, M. E.
**Some studies of the adsorption of zinc sulfate in Thompson Seedless grape canes.**
*Plant Physiol.*, 1956, **31**: 393-9, bibl. 6.
Lengths of vine stem were flushed with solutions of radioactive zinc sulphate and subsequently with distilled water and non-radioactive zinc sulphate. $Zn^{65}$ was apparently adsorbed on vessel walls and was dislodged much more readily by ordinary zinc sulphate than by distilled water. The higher the pH of the solution, the more rapid was the adsorption of $Zn^{65}$. The distribution pattern along the stem indicated accumulation in leaf traces at the nodes.—Univ. Calif., Davis.

1227. Ribereau-Gayon, J.
Maturation du raisin en fonction du climat et du cépage. **(The ripening of grapes as determined by climate and variety.)**
*Ann. Nutr., Paris*, 1955, **9**(5-6): 96, from abstr. in *Mitt. Klosterneuburg, Ser. A*, 1957, **7**: 54-5.
The composition of grapes of two varieties is compared, one of which is more affected by environmental conditions than the other. Experimental results confirm E. Peynaud's hypothesis that during maturation the acids are broken down by respiration, the rate of which depends on the summer temperature. Variations in the acid content from year to year are thus explained. In some years the fruit contains more tartaric than malic acid, as for instance in 1954. In most seasons the factors determining maturation are temperature, insolation and rainfall.

1228. Anon.
**Forecasting sultana yields.**
*Rur. Res. C.S.I.R.O.*, 1956, No. 17, pp. 3-6, bibl. 6, illus.
Sultana yield forecasts can be made sufficiently early to enable an appropriate degree of pruning to be adopted. The work at the Commonwealth Research Station at Merbein, which has led to reliable forecasting, is reviewed.

1229. Bernon, G.
Étude de la conservation du raisin après cueillette. **(Study on grape storage after picking.)**
*Progr. agric. vitic.*, 1957, **147**: 9-15, 33-7, illus.
Different storage environments were studied with grapes which had been sprayed with captan before picking. The incidence of *Botrytis cinerea* in storage was in all cases lower in captan-treated fruit than in untreated fruit. Forty-five days after picking, the highest percentage of clean fruit (58%) was found in the store where $SO_2$ was used in combinations with low temperature.

1230. Harvey, J. M.
**Effects of frequency of sulfur dioxide fumigation during storage on decay and fumigation injury in Emperor grapes.**
*Phytopathology*, 1956, **46**: 690-4, bibl. 25.
In 3 consecutive years grapes stored for 3 or 5 months were given 20 min. fumigation with sulphur dioxide, initially at 1% and subsequently, at 7-, 14- or 21-day intervals, at 0·25%. There was no consistent relationship between injury from, and frequency of, fumigation. During long storage the percentage of decay, caused mainly by *Botrytis cinerea*, fell with increasing frequency of treatment, but differences were not significant over the shorter period. The longer the storage and the later the harvesting, the higher was the percentage decay.—U.S.D.A., Fresno, Calif.

1231. Ildis, P., and d'Ersu, A. P.
Étude sur la réfrigeration des variétés de raisin cultivées au Maroc: Muscat, Muscat d'Alexandrie, Valensi royal, Cognac. **(A study on the cold storage of grape varieties grown in Morocco: Muscat, Muscat of Alexandria, Valensi Royal and Cognac.)**
*Cah. Lab. Froid Cons., Ain-Sebaa, Casablanca*, 1956, No. 3, pp. 13, from abstr. in *Food Sci. Abstr.*, 1956, **28**, No. 2338.
Details are given of the flavour and appearance, and the percentages of decayed and loose berries, in several Moroccan varieties of grape, stored at 0° and 4° C. for 6, 8, and 10 weeks, with or without sulphur dioxide fumigation every 15 days. Sulphur dioxide decreased the amount of decay and lengthened the storage life. Loss of weight varied from one lot of grapes to another, and depended on stage of maturity and also partly on variety.

## *Nuts.*

(*See also* 1144, 1145, 1240n, p, v.)

1232. Grolleau, J., and Vogel, R.
Note sur la fructification des amandiers à la station régionale horticole d'Aïn Taoujdat. **(Note on fruit production of almond trees at the regional horticultural station of Aïn Taoujdat.)**
*Terre maroc.*, 1956, **30**: 378-84, bibl. 1.
Data on flowering periods and yield are given for 4 almond varieties grafted in 1936 on local wild rootstocks, with special reference to the effects of annual variations of climate. [See also *H.A.*, 21: 2403.]

1233. Vieitez, E.
Problemas que plantea el estaquillado del castaño. **(Problems presented by propagation of chestnut from cuttings.)** [English summary ½ p.]
*An. Edafol. Fisiol. veg.*, 1956, **15**: 629-59, bibl. 4, illus.

October, and particularly November, were the only months suitable for taking cuttings of chestnut. From January to June there was complete lack of response to root-inducing substances and in the remaining 4 months response was very weak. Success was greater with terminal than with basal cuttings. Callus formation was not essential to rooting, but favoured it indirectly. Hormone treatments which were successful at 20°–23° C. proved toxic at 17° C. The optimal concentration of hormones depended on the vigour of the cuttings, but in general the following treatments were successful: 4 mg. each of IAA and NAA in 2 g. of talc; 8 mg. NAA per g. of talc; 4 mg. each of IBA and NAA in 2 g. of talc; 8 mg. IBA per g. of talc; 12 mg. IBA per g. talc; 100 p.p.m. aqueous IAA + 100 p.p.m. aqueous NAA. —Misión Biològica de Galicia, Pontevedra, Spain.

1234. Gammon, N., Jr., and Sharpe, R. H.
**Response of pecans to time and rates of nitrogen and potassium fertilization.**
*Proc. Soil Sci. Soc. Fla, 1955*, **15**: 124-9, bibl. 11.

The first 2 years' results are reported from fertilizer experiments on unproductive, old pecan trees at a low level of N fertility. It was found that trees will show a significantly increased nutrient level in the leaves the first year if sufficiently heavy fertilizer applications are made in the winter or early spring. The biggest response was from N applied on or before 1 February at 16 lb./tree. [See also *H.A.*, 27: 238.] It is suggested that to maintain the leaf N at a level commensurate with that found in leaves of high yielding trees 6–8 lb. N/tree would be needed each year in a grove where there were 12–17 trees/acre.—Fla agric. Exp. Stat., Gainescille.
J.R.L.

1235. Anon.
**New crop for the U.S.**
*Agric. Res. Wash.*, 1956, **5**(4): 13-14, illus.

Several promising varieties of pistachio have been developed for commercial growing in California. Some problems of harvesting and of preparing the nut for market are discussed.

1236. Šobek, J.
Výběr vlašských ořešáků. **(Selection of walnuts.)** [English, Russian and German summaries ½ p. each.]
*Sborn. čsl. Akad. zeměd. Věd, Rostl. Výroba*, 1956, **29**: 717-28, illus.

A search has been made for suitable walnut mother trees for seed in each fruit growing area in Czechoslovakia. Of 21,000 trees examined 8 were classified as first quality and 202 as second, and it is recommended that these should be used exclusively for propagation.

1237. Garavel, L.
La noix "Franquette". **(The Franquette walnut.)**
*Arboric. fruit.*, 1956, No. 34, pp. 5, 7, bibl. 10.

A note on the increasing popularity of this walnut variety in California, on its excellent qualities as a nut, on its cultural needs and its limitations. Pre-eminent for its nuts, comparative ease of cultivation and tolerance of environment, it is a late variety and is sometimes caught by early autumn frosts in California. In its youthful stages it is perhaps rather susceptible to bacterial infection, possibly as the result of excess of nitrogen.

1238. Rovskii, V. M., and Šamsiev, K. Š.
**The effect of stratification on walnut germination.** [Russian.]
*Sad i Ogorod*, 1956, No. 11, p. 51.

In Central Asia walnuts stratified in sand at 5 to 10° C. for 54 days gave 65% germination, those soaked in water for 14 days 43% and those untreated 38% germination. When stratified nuts were mulched with a 3 cm. layer of sawdust immediately after sowing germination was increased from 71 to 79% and seedling emergence was advanced.

1239. Tymko, M. M.
**The walnut in the shelter belts of Moldavia.** [Russian.]
*Doklady vsesojuz. Akad. seljsk. Nauk*, 1956, **21**(9): 32-5.

Growth measurements are given of young walnut trees grown in groves and shelter belts. In mixed shelter belts a combination of alternate rows of walnut and Lombardy poplar was found to be especially successful.

*Noted.*

1240.

a Cosmo, I., and Polsinelli, M.
Traminer aromatico. **(The vine variety Traminer aromatico.)** [English summary 3 lines.]
*Ann. Sper. agrar.*, 1956, Vol. **10**, No. 6, Suppl. pp. I-VIII, bibl. 9, illus.
A variety producing an aromatic white vine.

b (Cox, J. A., and Wilson, W. F., Jr.)
**Strawberry varieties recommended for Louisiana.**
*Fruit Var. hort. Dig.*, 1956, **11**: 19.
Brief notes on Klondmore, Marion Bell and Konvoy.

c Doesburg, J. J., and Kronenberg, H. G.
De waarde van verschillende zwarte besserassen voor de verwerkingsindustrie. **(The value of several blackcurrant varieties for the preserving industry.)**
Reprinted from *Conserva*, 1956, **4**: 374-5, bibl. 3.
Based on contents of vitamin C and acids.

d Del Gaudio, S., and Giusto, D.
Pagadebito. **(The vine variety Pagadebito.)** [English summary 3 lines.]
*Ann. Sper. agrar.*, 1956, Vol. **10**, No. 6, Suppl. pp. LIII-LIX, bibl. 9, illus.
A white vine variety.

e GIORGI, E.
Aspetti economici della meccanizzazione nel vigneto specializzato in Toscana. (**The economics of mechanization in Tuscan vineyards.**)
*Atti Accad. ital. Vite 1955*, 1956, **7**: 155-77.
The author shows how reasonable mechanization can greatly reduce the cost of wine production in Tuscany.

f ISOTALO, A.
Pohjois-Suomen puutarhataloudesta. (**Horticulture in north Finland.**) [English summary 16 lines.]
*Maatalous ja Koetoim.*, Part 10, 1956, pp. 216-20.
Only berry fruits thrive without glass.

g KOMAROVA, E. S.
**New Hungarian vine varieties.** [Russian.]
*Vinodelie i Vinogradarstvo*, 1956, No. 7, pp. 39-42.
Introduced into the Ukraine.

h KONLECHNER, H.
Rationalisierung im österreichischen Weinbau. (**The reorganisation of Austrian viticulture.**) [English, French, Spanish summaries, about 12 lines each.]
*Mitt. Klosterneuberg, Ser. A*, 1956, **6**: 286-309, bibl. 31, illus.
Economies are to be achieved chiefly by mechanization and high training.

i KONLECHNER, H.
Holder-Diesel-Allradschlepper A 10 im Einsatz. (**The Holder diesel tractor with a 4-wheel drive in the vineyard.**) [English, French, Spanish summaries 2 lines each.]
*Mitt. Klosterneuburg, Ser. A*, 1956, **6**: 313-21, illus.
The "Cultitrac".

j KONLECHNER, H.
Über den Einsatz des Klein-Raupenschleppers "Winzerknecht". (**On the use of the small caterpillar tractor Winzerknecht in the vineyard.**) [English, French, Spanish summaries, 2 lines each.]
*Mitt. Klosterneuburg, Ser. A*, 1957, **7**: 30-7, illus.
A new Austrian model.

k KUZ'MIN, A. JA., AND OKNINA, E. Z.
**Frost resistance and the depth of dormancy in vines.** [Russian.]
*Vinodelie i Vinogradarstvo*, 1956, No. 7, pp. 27-35, bibl. 8, illus.
For a similar account see *H.A.*, 26: 3442, and for the method of estimating frost resistance by the depth of dormancy *H.A.*, 26: 3249.

l MALAN, A. H.
**The culture of table grapes.**
*Fmg S. Afr.*, 1956, 32(9): 65-80, bibl. 35, illus.

m MANZONI, L.
Germinazione del vinacciolo e primo sviluppo della vite da seme. (Seconda puntata e fine.) (**Germination of seeds and early development of vine seedlings. (Second and final part.)**)
*Riv. Vitic. Enol.*, 1956, **9**: 303-17, bibl. 17, illus.
Special reference is made to stem and root anatomy. [For part 1 see H.A., 27: 241x.]

n MARTINOZZI, N. C.
Il nocciuolo. (**Hazel nuts.**)
*Ital. agric.*, 1956, **93**: 912-30, illus.
Cultivation and production figures in various districts of Italy.

o OLMO, H. P.
Alcuni aspetti della viticoltura e della produzione del vini e dell'uva secca in Australia. (**A glance at Australian viticulture, and the production of wine, currants and raisins.**)
*Atti Accad. ital. Vite 1955*, 1956, **7**: 463-500, bibl. 48.
A comprehensive, interesting account. [Isn't it time someone did it in English, or have we missed it?]

p PASTORE, R.
La situazione della mandorlicoltura mondiale. (**The world situation in almond growing.**)
*Riv. Fruttic.*, 1956, **18**: 419-25, illus.

q RAO, U. N., MUTHUSWAMY, S., AND RAMANATHAN, R.
**A note on an introduced grape variety, Anab-E-Shahi.**
*South Indian Hort.*, 1956, **4**: 22-3, illus.
A white dessert variety introduced at Coimbatore from Hyderabad.

r RICHARDSON, A. M.
**Training the young grape vine.**
*Qd agric. J.*, 1956, **82**: 541-4, illus.

s ROEVER, W. E.
**The strawberry, past and present.**
*Fruit Var. hort. Dig.*, 1956, **11**: 27-30, illus., from *Pap. 50th annu. Mtg Tenn. hort. Soc.*
Historical notes on varieties and the Tennessee breeding programme.

t SOLDATOV, P. K.
**Clonal selection of vines.** [Russian.]
*Vinodelie i Vinogradarstvo*, 1956, No. 7, pp. 42-9, bibl. 20, illus.
For better size and quality of grape.

u VIOLANTE, C., AND CIARIMBOLI, U.
Fiano. (**The vine variety Fiano.**) [English summary 6 lines.]
*Ann. Sper. agrar.*, 1956, Vol. **10**, No. 6, Suppl. pp. LXI-LXXI, bibl. 21, illus.
A white variety mainly grown for wine, but also suitable for dessert.

v VIVOLI, T.
Il nocciuolo come pianta da frutto nell'alta valle del Santerno. (**Cultivation of hazel nuts in the upper Santerno valley.**)
*Frutticoltura*, 1956, **18**: 452-6, illus.
Characteristics of 4 varieties, with notes on planting, manuring and soil management.

w WELKERLING, E. M. L.
Descripción de dos nuevas variedades de frambuesos introducidas al país. (**Description of two new raspberry varieties introduced into Argentina.**)
*Rev. Fac. Cien. agrar. Mendoza*, 1954, **4**(2): 39-42, bibl. 2, illus.
Malling Promise and Malling Landmark.

## PLANT PROTECTION OF DECIDUOUS FRUITS.

### *General.*

(*See also* 1188, 1371s, 1961l.)

### *Air pollution.*

(*See also* 1084u, 1371v, 1780, 1793.)

1241. MCNULTY, I. B., AND NEWMAN, D. W.
**The effects of a lime spray on the respiration rate and chlorophyll content of leaves exposed to atmospheric fluorides.**
*Proc. Utah Acad. Sci.*, 1955-1956, **33**: 73-9, bibl. 10.

Trees of Italian prune and Early Elberta peach growing in a fluoride-polluted atmosphere were sprayed with a solution of calcium hydroxide to produce a protective layer of insoluble calcium fluoride on the leaves. The rate of respiration was higher in sprayed leaves than in unsprayed leaves, after allowing for the reduction in respiration caused by the calcium hydroxide itself. Sprayed leaves were found to contain about twice as much chlorophyll as unsprayed leaves. It is concluded that sub-lethal concentrations of fluorides inhibit respiration and decrease chlorophyll content.—Univ. Utah.

### *Disturbances of nutrition or of unknown origin.*

(*See also* 1020.)

1242. HAFIZ, A., AND MURTAZA SHARIF, M.
**Deficiency diseases of plants and their control measures. 1. Fruit trees.**
*Agric. Pakist.*, 1956, **6**(2): 17-27, bibl. 3.

A review article dealing with deficiencies of N, K, Ca, P, Mg, B, Zn, Mn, Fe, Cu and S and dosages of particular salts per acre and per plant suitable for soil or spray application to remedy these deficiencies.

1243. BRANAS, J., AND BERNON, G.
La carence de bore dans les vignobles français. (**Boron deficiency in French vineyards.**)
*Progr. agric. vitic.*, 1956, **146**: 259-70, 334-43, 356-61, 388-94 and 414-19, bibl. 16, illus.

The symptoms and occurrence of B deficiency as observed in French vineyards are reported in detail. The deficiency appears to occur most often on non-calcareous soils, and where artificial fertilizers are generally applied. Some differences in scion and rootstock susceptibility are noted. Soil applications of borax have been most successful in correcting the deficiency.

1244. REFATTI, E.
La borocarenza delle pomacee nell'Italia settentrionale. Parte II. (**Boron deficiency in apple and pear trees in northern Italy. Part II.**) [English summary ¾ p.]
*Ann. Sper. agrar.*, 1956, **10**: 1841-70, bibl. 53.

Symptoms are described and susceptible varieties listed. Effects of soil and climate are discussed. Recommendations are made for application of B by injection into the soil and by foliar spraying. [For Part I see *H.A.*, 27: 347d.]

1245. AHMED, M. B., AND TEWFIK, M.
**A study on the rootstocks of pear with special reference to the incidence of iron chlorosis.**
*Indian J. Hort.*, 1956, **13**: 47-56, bibl. 14.

A marked reduction in growth and development due to chlorosis was observed in *Pyrus calleryana*, *P. communis* seedlings and quince cuttings during the second season of growth in a soil with pH 7·5 to 7·8. No chlorosis was apparent in Le Conte plants propagated by cuttings. *Pyrus calleryana* was the most susceptible to the chlorosis.—Univ. Cairo. [See also *H.A.*, 26: 3468.]

1246. GASSER, R., AND MÜLLER, G.
Les traitements contre la chlorose des plantes. (**The correction of plant chlorosis.**)
*C.R. Acad. Agric. Fr.*, 1956, **42**: 713-17.

Lime-induced chlorosis in 5-year-old pears was corrected more quickly by foliar than by soil applications of chelates. Three to 4 applications of 0·5% Sequestrene NaFe corrected chlorosis. In a test with espalier pears chlorosis correction was more complete with soil applications of Chel 330 HFe or Sequestrene NaFe than with foliar applications. Further tests in the spring showed that Chel 138 HFe and RA 157 had the quickest action of the chelates tested.

1247. KNOPPIEN, P.
Magnesiumbemesting op zandgrond. (**Magnesium fertilization on a sandy soil.**)
*Fruitteelt*, 1956, **46**: 1116-17, illus.

Magnesium sulphate in 2 forms was given to Jonathan on M.IV growing on sandy soil. It had little effect on Mg deficiency in the first year but subsequently yields were increased by 10 to 15% in 4 out of 5 plots. Of other elements applied only K had a positive effect on Mg deficiency. Applications of farmyard manure had little effect on Mg deficiency in the first year, but its effect was comparable to that of magnesium sulphate in the long run.

1248. Staehelin, M., and Bovay, E.
Colorations automnales précoces sur vignes. **(Premature autumn colouring of vines.)** [German, English and Italian summaries ¼ p. each.]
*Landw. Jb. Schweiz*, 1956, **5**: 543-54, bibl. 12, illus.

Interveinal chlorosis followed by necrosis became apparent on Chasselas grafted on Riparia × Rupestris 3309 from the end of June onwards. Symptoms were more severe in vineyards which were not sprayed with bordeaux. Analyses in October of chlorotic and necrotic leaves showed a low level of Mg.—Lausanne.

1249. Lamb, J. G. D.
**Observations on manganese deficiency in raspberries on organic soils.**
*J. Dep. Agric. Dublin*, 1955/56, **52**: 117-30, bibl. 14, illus.

Observations and experiments were made in fenlike soils composed of moderately to highly decomposed organic material with a fair content of mineral matter, generally of favourable structure and slightly acid to alkaline in reaction. The symptoms of Mn deficiency noted include chlorosis of the lower leaves of raspberry canes and dieback of the canes after the winter. Associated symptoms are chlorosis of upper leaves different to that due to Fe deficiency and a chlorosis of leaves on the fruiting canes. The incidence of these phenomena can be predicted through chemical analysis of soil and by observing Mn deficiency symptoms in certain [named] wild plants. Figures are given for treated and untreated canes of Mn content of normally coloured and of chlorotic leaves and of leaves after treatment. Suitable spraying treatments and times are discussed. Successful treatment consisted of 2 applications of 2% $MnSO_4$, one in April, the other in July. Treatments with manganese di-sodium versenate, 0·25% $FeSO_4$ or 0·25% borax were unsuccessful. Malling Jewel was the main variety under trial but Malling Promise and Malling Notable were also found to be very susceptible and Lloyd George slightly less so.

1250. Wilson, E. E., and Schein, R. D.
**The nature and development of noninfectious bud failure of almonds.**
*Hilgardia*, 1956, **24**: 519-42, bibl. 11, illus.

The disorder known as almond bud failure has assumed considerable importance in the Sacramento Valley. It affects the Nonpareil and Peerless varieties moderately and Jordanolo severely. The Texas and Jubilee varieties are affected by a disorder provisionally considered to be bud failure, although its identity has not yet been proved. The primary symptom is failure of buds to grow; secondary symptoms may be excessive shoot production, delay in blossoming and bark necrosis. Factors affecting symptom expression are discussed. Tests have shown that the disorder is not transmissible by budding or grafting and is therefore non-infectious. It is thus distinct from the virus-type bud failure found in the Drake variety. The noninfectious type of bud failure, however, is bud perpetuated, and vegetative propagation by budding tends to increase symptom expression. The disorder is seed transmitted.—Univ. Calif., Davis.

1251. Anon.
Casi fitopatologici. **(Cases of plant disease.)**
*Inf. fitopat.*, 1956, **6**: 235, illus.

Two abnormalities, the causes of which are unknown, are reported in fruit from otherwise healthy trees of Abbondanza apples. One consists of oval shaped depressions in the skin, remaining green after the rest has ripened and usually developing blackish cracks, or of rings or patches of skin which remain or become whitish. The other consists of dark concentric rings on the skin, sometimes coalescing. Both disorders are probably infectious.

1252. Bollard, E. G.
**Effect of steam-sterilized soil on growth of replant apple trees.**
*N.Z. J. Sci. Tech., Sect. A*, 1956, **38**: 412-15, bibl. 8.

The poor growth of apple trees on Northern Spy stock in soil that had previously grown trees on the same stock has been reproduced in pot experiments. Steam sterilization of this soil permitted as much growth as in fresh soil. Trees on Malling XII stock made satisfactory growth in soil that had previously grown trees on Northern Spy, but there was an indication of improved growth following soil sterilization. There was no sign of parasitic attack on roots of trees in either unsterilized or sterilized soil. [Author's summary.]—Fruit Res. Stat., D.S.I.R., Auckland.

1253. Włodek, J., and Marzec, T.
Przyczynek do poznania zagadnienia "wyczerpywania gleby" przez szkółki drzew owocowych". **(A contribution to the problems of soil sickness caused by successive planting of fruit trees in the nursery.** [English and Russian summaries ½ p. each.]
*Prace Inst. Sadown. Skierniewice*, 1955, **1**: 67-80, bibl. 13.

Analyses of soil from a plot where apple rootstocks made satisfactory growth were compared with those of a "sick" nursery plot. Sick soil had a higher pH and a lower content of Al. No differences between contents of N, available $P_2O_5$, $K_2O$, CaO or humus were apparent in the 2 soil types. No significant differences in soil fauna were found between the 2 soil types, but nematode numbers were higher in the "sick" soil.

### *Climatic factors.*

(*See also* 1011, 1094, 1097, 1100, 1371f.)

1254. Lawrence, E. N.
**Estimating the frost risk of an orchard site.**
*N.A.A.S. Quart. Rev.*, 1956, No. 34, pp. 147-51, bibl. 5, illus.

The economic risk due to spring frosts is calculated for 4 sites at Rosemaund Experimental Husbandry Farm, Preston Wynne, Herefordshire. A formula is given from which the number of years in ten, in which a temperature lower than any particular value may be expected, can be calculated. This involves converting 2–3 years' record of the daily minimum temperature at a site into long term values by referring to records from nearby meteorological stations. J.R.L.

1255. Pieniążek, S. A., Grochowska, M., and Rejman, A.
Uszkodzenia mrozowe czereśni w czasie zimy 1953–54 r. **(Winter injury to sweet cherry in 1954.)** [Russian and English summaries ¾ p. each.]
*Prace Inst. Sadown. Skierniewice*, 1955, **1**: 25-42, bibl. 19, illus.

Longitudinal deep cracks in cherry trunks were common after the severe winter of 1954. They occurred on all sides of the trunk, and whitewashing the trunks did not affect their occurrence. Splits were more frequent with high-headed trees on mahaleb than with low-headed trees on mazzard. Injuries to shoots, spurs, and fruit and leaf buds were also observed. Urea sprays applied at the bud-breaking stage did not affect tree regeneration.

1256. Belohonov, I. V.
**Prevention of frost damage to fruit trees.** [Russian.]
*Sad i Ogorod*, 1956, No. 11, pp. 37-40, illus.

Frost protection of young fruit trees by mulching, earthing up, snow covering, whitewashing or wrapping the stems, and autumn irrigation plus P and K fertilizer application is described.

1257. Bell, —., and others.
Vorträge über Frostschutz. **(Lectures on frost protection.)**
*Mitt. dtsch. Wetterdienst.*, 1956, Vol. **3**, No. 16, pp. 85, bibls, illus.

As the President of the Meteorological Service in Germany, Dr. Bell, explains in the foreword, a working group on frost protection has been formed which, so far, has convened two meetings, in November 1955 and in April 1956 respectively. At the first meeting representatives of various bodies constituting the group discussed general aspects of the problem (pp. 5–25), while at the second the following papers were read by members of staff of the German Meteorological Service:

H. Burckhardt, Preventive frost protection and frost protection by irrigation, pp. 26-33, bibl. 13.

P. Lehmann, Frost protection by biological and cultural measures as well as by covering, heating and combined measures, pp. 54-61.

H. Aichele, Testing of frost protection equipment in Wurtemberg, pp. 62-8.

H. Aichele, The prevention of frost damage by smoke and mist, pp. 69-76.

J. van Eimern, Frost protection by fans, pp. 77-85, bibl. 10.

1258. (Modlibowska, I.)
Les problèmes de gelées printanières dans les plantations fruitières. **(Problems of spring frosts in orchards.)**
*Arboric. fruit.*, 1956, No. 33, pp. 9, 13.

A brief summary of a paper, read at the 87th International Conference of the Société Pomologique de France, dealing with frost damage, the mechanism of freezing in plant tissues, frost resistance and protective measures, particularly sprinkler irrigation.—E. Malling Res. Stat.

1259. Hirt, W.
Lutte contre la gelée par arrosage. Protection des abricotiers dans le canton du Valais en 1956. **(Frost control by sprinkler irrigation. Protection of apricots in the Valais canton in 1956.)**
*Rev. hort. suisse*, 1957, **30**: 9-11, illus.

In the Rhône Valley sprinkler irrigation from 10.30 p.m. to 10 a.m. successfully protected flowering apricots from a frost of −5° C. [See also *H.A.*, 27: 258.]

### *Viruses.*

(*See also* 1202, 1371a, d, n, o, z, 1976.)

1260. (Sommereyns, —.)
Mise au point de l'identification des viroses des arbres fruitiers par voie biochimique. **(Improvement of identification of fruit-tree viruses by biochemical methods.)**
*Parasitica*, 1956, **12**: 138-9.

A brief summary of a discussion criticising Lindner's chemical identification method by testing for polyphenol compounds and his method involving absorption spectra, and recommending grafting tests.

1261. Scaramuzzi, G.
Aspetti e problemi attuali delle malattie da virus in relazione alla frutticoltura arborea italiana. **(Present-day aspects and problems of virus diseases in relation to Italian top fruit growing.)** [English summary 8 lines.]
*Riv. Ortoflorofruttic. ital.*, 1956, **40**: 369-402, bibl. 4, illus.

Virus diseases of apple, pear, peach, plum, cherry, almond, fig and hazelnut in Italy are discussed with brief reference to diagnosis and indexing by means of indicator plants.—Lab. crittog. Ital., Pavia, and Ist. Patol. veg., Univ. Bari.

1262. Fulton, R. W.
**Nonidentity of apple mosaic and tobacco streak viruses.**
*Phytopathology*, 1956, **46**: 694, bibl. 1.

Transmission tests from tobacco to apple *via* dodder failed to infect apple seedlings with tobacco streak virus. This and other evidence showed the two viruses as distinct, although similar in host range and properties. —Univ. Wisconsin, Madison. [See also *H.A.*, 26: 1539.]

1263. Guengerich, H. W., and Millikan, D. F.
**Transmission of the stem pitting factor in apple.**
*Plant Dis. Reptr*, 1956, **40**: 934-8, bibl. 6, illus.

Bark splitting and wood pitting of Virginia Crab stem pieces in double worked apple trees has been experimentally reproduced in healthy trees by budding and bark-grafting from infected trees. The disease is therefore considered to be a virus. Most varieties appeared to be resistant, and Virginia Crab is the most sensitive indicator so far found.—Mo agric. Exp. Stat., Columbia.

1264. Posnette, A. F.
**Virus diseases of pears in England.**
*J. hort. Sci.*, 1957, **32**: 53-61, bibl. 10, illus.

An investigation of the virus diseases occurring in commercial stocks of pears and in quince rootstocks

has shown a high incidence of infection with viruses causing 5 types of symptoms. Three types, mosaic, vein yellows and red mottle, occur on pear; two types, stunt and sooty ring spot, develop on quince and the viruses are latent in pear. Of the species and varieties tested, Quince E seedlings proved to be the most reliable indicators; clones derived from two of these reacted characteristically when budded on to quince rootstocks infected with either mosaic, sooty ring spot or the stunt virus. The evidence from observations and tests on a range of rootstocks and scion varieties suggests that the high incidence of infection is due primarily to the use of infected material on propagation. The selection of virus-tested material of commercial varieties for distribution is in progress. [Author's summary.]—E. Malling Res. Stat.

1265. Boek, K.
**Untersuchungen über Viruskrankheiten der Süsskirsche. (Studies on virus diseases of sweet cherries.)**
*Mitt. ObstVersuchsringes Jork*, 1956, **11**: 153-9, 214-18, 232-8, 266-72, bibl. 29, illus.

The symptoms, commercial importance and transmission of Pfeffinger disease, ring spot, tatter leaf and "narrow leaf" are described. Three other types of virus-like but non-transmissible variegation symptoms which have been observed in cherry are also described.

1266. Milbrath, J. A., and Williams, H. E.
**Bud abortion—a virus disease of cherry.**
From abstr. in *Phytopathology*, 1956, **46**: 639.

Leaf mottling and bud abortion were observed on a Napoleon sweet cherry. When Bing and Montmorency trees were inoculated symptoms of necrosis and dieback occurred. Inoculated peach trees did not show any effect of the virus.

1267. Milbrath, J. A., and Williams, H. E.
**A decline of sour cherry caused by a virus of the little cherry type.**
*Phytopathology*, 1956, **46**: 535-7, bibl. 5, illus.

A virus disease that causes a serious decline in growth of Montmorency sour cherry trees and small, late-maturing, orange-pink fruits was first observed in 1951. The virus was graft-transmitted to Montmorency and to 4 sweet cherry varieties. The symptoms shown by sweet cherry were milder than those shown by sour cherry. The symptoms were similar to those of the little cherry type virus recently reported as being present in normal-appearing Kwanzan and Shiro-fugen flowering cherry.—Ore St. Coll., Corvallis.

1268. Reeves, E. L., and Cheney, P. W.
**A new form of the twisted-leaf virus disease of cherries.**
From abstr. in *Phytopathology*, 1956, **46**: 639.

A new virulent form of twisted leaf virus of cherry induced recognizable symptoms in cherry varieties which showed twisted leaf symptoms and also in those which were symptomless carriers. Black Tartarian was the only variety tested which acted as a symptomless carrier of this new form.

1269. Wagnon, H. K., and Breece, J. R.
**Peach calico, one of many virus diseases of stone fruits.**
*Bull. Calif. Dep. Agric.*, 1956, **45**: 256-8, bibl. 14, illus.

The symptoms of peach calico, which is not known to occur outside the United States, are described. The disease is spread by infected propagating material.

1270. Turica, A.
**Trasmisión por insectos de un nuevo virus. (Insect transmission of another virus.)**
*Idia*, 1956, No. 102, pp. 15-18, bibl. 3, illus.

Experiments showed that leaf-margin scorch of plums was transmitted by the aphis *Myzus persicae* but not by *Ormenis cestri*. Symptoms developed 150 days after infection. The varieties Reine Claude and Santa Rosa on myrobalan and Abundance (seedling) were susceptible.

1271. Flock, R. A., and Wallace, J. M.
**Fig mosaic transmitted by mite.**
*Calif. Agric.*, 1957, **11**(1): 12, 15, illus.

In tests the fig mite, *Aceria ficus*, transmitted the fig mosaic virus. This is the first occasion on which mite-transmission of a fruit tree virus has been demonstrated.

1272. Becker, R. F., and Rich, A. E.
**Increased runner production and fruit yield of virus-free strawberry plants over commercial stocks in New Hampshire.**
*Plant Dis. Reptr*, 1956, **40**: 947-51, bibl. 8.

The average numbers of runner plants produced per mother plant in 1954 for virus-free Catskill, Premier and Sparkle were 89, 160 and 95, respectively, and for commercial plants 39, 93 and 81. Yield data were taken in 1955. The average yields per clone for the virus-free Catskill, Premier and Sparkle were 10·6, 13·5 and 10·9 quarts, respectively, as compared to 3·9, 8·0 and 7·2 quarts for the locally grown commercial plants. [See also *H.A.*, 26: 3496.] The greater fruit yield of the virus-free clones of each variety seemed to be due more to a larger number of plants produced in these clones than to more or larger berries per plant. [From authors' summary.]—New Hampshire agric. Exp. Stat., Durham.

1273. Miller, P. W., and Vaughan, E. K.
**Yellows virus complex in Marshall strawberry plants not inactivated by growth-regulating, antibiotic, and certain other chemicals.**
*Plant Dis. Reptr*, 1957, **41**: 17-18, bibl. 2.

In tests carried out on potted strawberry plants since 1949 the yellows virus complex was not inactivated by Acti-dione, Agri-mycin, Aureomycin, Anisomycin, Oligomycin, Rimocidin, Streptomycin sulphate, sulphaguanidine, sulfamerizene, Terramycin, α-chlorophenoxypropionic acid, β-naphthoxyacetic acid, indol butyric acid, maleic hydrazide, NAA, n-meta tolylphthalamic acid, ceric ammonium nitrate, chelated copper, o-chlorobenzoic acid, oxyquinoline benzoate, p-nitro phenol, 2,3,5-tri-iodobenzoic acid, 8-hydroxyquinoline, zinc chloride or zinc sulphate.—Ore. agric. Exp. Stat., and U.S.D.A. J.R.L.

1274. KAUSCHE, G. A., THATE, R., AND BRÜCKBAUER, H.
Elektronenmikroskopische Untersuchungen zum Problem der Reisigkrankheit der Rebe. **(Electronmicroscopic studies on court noué in vines.)**
*Wein-Wiss.*, 1955, **9**(6): 25, from abstr. in *Mitt. Klosterneuburg, Ser. A*, 1957, **7**: 46-7.
The sap of vines affected with court-noué showed oval to round-oval bodies under the electron-microscope, but no rods. Only the presence of the latter would prove the virus nature of the disease.

1275. CICCARONE, A.
Riunione Internazionale per lo studio della degenerazione infettiva della vite. **(International congress for the study of infectious degeneration of the vine.)**
*Inf. fitopat.*, 1956, **6**: 236-7, illus.
Symptoms and their nomenclature are discussed. Leaf roll is a doubtful member of the syndrome and yellow vein, identified in the U.S.A., is little known in Europe. Certain symptoms appear to be transmissible by seed, but the syndrome is not contagious, and no pest vector has been found in Europe. In California, however, at least one of the viruses concerned (fan-leaf) has been identified in nematodes of the genera *Xiphinema* and *Criconemoides*, ectoparasites on vine roots. In France dead roots have remained infectious for nearly 10 years in the soil.

1276. HEWITT, W. B., AND GIFFORD, E. M., JR.
**Symptoms for identifying fanleaf in dormant grapevines.**
*Bull. Calif. Dep. Agric.*, 1956, **45**: 249-52, bibl. 9, illus.
Studies have shown that vines showing leaf symptoms of fanleaf had a high frequency of cane deformities in comparison with healthy vines. The occurrence of short internodes and double nodes at a frequency of one to every other cane or more is considered to be good evidence that the vine has fanleaf.

1277. GIFFORD, E. M., JR., AND OTHERS.
**An internal symptom for identifying fanleaf in the grapevine.**
*Bull. Calif. Dep. Agric.*, 1956, **45**: 268-72, bibl. 9, illus.
Trabeculae were present in the water-conducting cells of the xylem in all except one of the vines artificially inoculated with fanleaf and showing external symptoms.

1278. SCARAMUZZI, G.
Polimorfismo sintomatologico del complesso virosico del mandorlo conosciuto come "mosaico" in Puglia. Parte II. **(Symptomatological polymorphism of the virus complex of almond trees known as mosaic in Apulia. Part II.)** [English summary ½ p.]
*Ann. Sper. agrar.*, 1956, **10**: 1789-1808, bibl. 40, illus.
Diseased scions of almond transmitted the virus complex to almond, apricot, peach and plum rootstocks. In every instance symptoms of line pattern appeared in the leaves and in severe cases foliar symptoms became more complex, including deformity, and fruits were affected. The conclusion is that the so-called mosaic virus of almond produces different symptoms according to the degree of resistance of the host. The possibility of seed transmission is being investigated. [For Part I see *H.A.*, 27: 274.]

### *Bacteria.*

(*See also* 1089.)

1279. YOUNG, R. A., AND DEEP, I. W.
**Increase in incidence of crown gall on Mazzard cherry following preplanting treatments with organic fungicides.**
From abstr. in *Phytopathology*, 1956, **46**: 640.
While evaluating chemicals in preplanting dip treatments for crown gall control, it was found that the incidence of gall on seedling trees that were root pruned, inoculated and then treated with dichlone (2 lb./100 gal.) was consistently much higher than that on similar inoculated but untreated seedlings. Respiration of *Agrobacterium tumefaciens* was stopped by 100 p.p.m. of dichlone and decreased by 1 p.p.m. Dichlone treatment of 1-year-old trees did not consistently increase their growth. Immersing the roots of inoculated seedlings in a suspension of fungi cultured from cherry roots significantly decreased the incidence of gall as compared to that of the inoculated check or of dichlone- or captan-treated trees.

1280. DEEP, I. W.
**Effectiveness of preplanting treatments with antibiotics in preventing crown gall on Mazzard cherry.**
From abstr. in *Phytopathology*, 1956, **46**: 635.
One-year-old Mazzard cherry trees were root pruned, inoculated with *Agrobacterium tumefaciens* and treated for various lengths of time with several concentrations of Agrimycin, streptomycin, and terramycin. The most effective treatments, without phytotoxicity, were 15 min. in 400 p.p.m. terramycin or 1 hour in 200 p.p.m. terramycin. Gall incidence was 49% and 41% respectively compared with 99% in the inoculated control.

1281. PARKER, K. G., FISHER, E. G., AND MILLS, W. D.
**Fire blight on pome fruits and its control.**
*Cornell Ext. Bull.* **966**, 1956, pp. 23, illus.
Susceptible apple and pear varieties and other hosts in the Rosaceae are listed. Symptoms, mode of infection and influence of climate and soil are described. Control measures discussed include cultural practices, spraying (especially with streptomycin), control of insect vectors and use of canker paint.

1282. MILLER, P. M.
**Control by different streptomycin formulations of fire blight on Bosc pears in Connecticut.**
*Plant Dis. Reptr*, 1957, **41**: 19-22, bibl. 2, illus.
Streptomycin sulphate, streptomycin nitrate, and streptomycin sulphate combined with Terramycin applied in May gave equal control of pear fire blight at 200 p.p.m. Streptomycin sulphate at 75 p.p.m. combined with 500 p.p.m. of either glycerin, calcium

nitrate, or kerosene gave poor control. All formulations at 200 p.p.m. caused some chlorosis of foliage. Streptomycin sulphate at 400 p.p.m. applied to well established infections in June did not stop or delay further development of these infections. [From author's abstract.]—Conn. agric. Exp. Stat., New Haven.

### *Fungi.*

(*See also* 1196, 1198, 1204, 1229, 1230, 1371d, e, g, i, q, t, u, x.)

1283. Campbell, L.
**Control of plant diseases by soil-surface treatment.**
From abstr. in *Phytopathology*, 1956, **46**: 635.

Several methods of soil surface treatment for disease control have shown promise at the Western Washington Experiment Station. In numerous experiments mint rust was effectively controlled by a pre-emergence soil-surface spray of dinitro amine or of certain fungicides. Pentachloronitrobenzene sprayed on the surface of the soil immediately after seeding reduced *Corticium* black root of cauliflower by up to 97%. Early post-emergence sprays of dichlone and of pentachloronitrobenzene reduced *Sclerotinia* stem rot of beans by 50% and 37% respectively. A preharvest dust of captan following each cultivation reduced *Botrytis* fruit rot of strawberries by 75%.

1284. Strecker, B.
Untersuchungen über die Einwirkung von organischen Fungiziden auf Bodenpilze. **(Studies of the effect of organic fungicides on soil fungi.)** [English summary ½ p.]
*Z. PflKrankh.*, 1957, **64**: 9-35, bibl. 83, illus.

Laboratory tests were carried out to study the effect of several fungicide materials on soil fungi species which included *Alternaria tenuis*, *Aspergillus niger*, *Fusarium culmorum*, *F. solani* and *Rhizoctonia solani*. Three groups of fungicidal compounds became apparent. When spore suspensions were inoculated into the nutrient agar media, increasing concentrations of the lower dialkyl-dithiocarbamates reduced the growth intensity of the fungi. Both dimethyldithiocarbamate and thiram showed a preliminary increase in fungicidal activity followed by reduced activity with increased concentrations. Pentachloronitrobenzene was exceptional in that against spores its effect was unspecifically fungistatic, while against the mycelium it was selectively fungistatic.—Univ. Göttingen.

1285. (Soenen, —., and Aerts, —.)
Le choix des fongicides en arboriculture fruitière. **(The choice of fungicides in top-fruit growing.)**
*Parasitica*, 1956, **12**: 139-41.

In experiments on apple scab control no fungicide gave good results in the laboratory, but some (not specified) were highly effective under natural conditions. For pre-flowering treatment the new Belgian product CPR 32 is recommended. The Mills schedule for forecasting scab attacks did not fail to forecast any actual attack, but in some cases no scab appeared where a heavy attack had been forecast. In general captan and urbacide were the most suitable products for mildew control.

1286. Král, J.
Možnost provádění postiřků proti strupovitosti jabloní podle zkušeností o průběhu náletu ascospor houby *Venturia inaequalis* (Cook) Aderhold. **(The possibility of spraying against apple scab according to the discharge of ascospores of the fungus *Venturia inaequalis*.** [English, Russian and German summaries ¾ p. each.]
*Sborn. čsl. Akad. Zeměd. Věd, Rostl. Výroba*, 1956, **29**: 779-94, bibl. 22, illus.

Dates are given of the first, maximum and final ascospore discharge at Praha-Ruzině in 1953, 1954 and 1955. In 1953 the total average daily temperature sum required from March 1 for the release of ascospores was 124° C., in 1954 150° C. and in 1955 108° C. Laboratory experiments gave a figure of 140° C. In 1953 and 1954 some ascospores were probably discharged before they were trapped, and it is suggested that release begins with the first rainfall following the attainment of the temperature sum of 104° C. Spraying according to ascospore discharge is considered to be more effective than spraying according to developmental stages of the tree.

1287. Miller, P. M.
**Performance of apple scab fungicides under severe infection conditions.**
*Plant Dis. Reptr*, 1956, **40**: 1118-19, bibl. 1.

Mesulfane, Norsulfane, Thioneb, thiram wettable powder and captan gave excellent control of apple scab at 2 lb. per 100 gal., as did thiram paste at 3 lbs. Thiram paste gave better control than thiram wettable powder, probably owing to better residual power. Dichlone at ⅛ lb. gave poor control, but excellent control at ¼ lb. or more. It is suggested that ¼ lb. of dichlone is adequate for normal spraying of apples. [From author's summary.]—Conn. agric. Exp. Stat., New Haven.

1288. Biological Branch, N.S.W. Department of Agriculture.
**Black spot of apple and pear—control by eradication spray treatment.**
*Agric. Gaz. N.S.W.*, 1956, **67**: 425-7, illus.

Experiments over the last few years have shown that a simple fungicidal spray of the eradicant type will give better control of black spot [scab] of apples and pears at lower cost than the previous programme of protective sprays. Control can be obtained by spraying the dead leaves on the ground during the winter with sodium dinitro ortho cresylate or ammonium sulphate, or by spraying the trees during the spring or summer with low concentrations of organic mercury compounds within 70 to 80 hours of the beginning of a rainy period, or by applying high concentrations of organic mercury compounds to infected leaves in the autumn. This last is the most effective treatment if adequately applied, but is of no lasting value if unsprayed apple and pear trees are within 2 miles. "Present evidence indicates that treatment in two successive autumns with a full schedule of protective sprays in the intervening season will either eliminate black spot from an area or reduce it to a state where the only spraying

required will be an annual autumn treatment with phenyl mercuric chloride or other non-phytotoxic organic mercury preparation." J.R.L.

1289. Biological Branch, N.S.W. Department of Agriculture.
**Black spot of apples and pears.**
*Agric. Gaz. N.S.W.*, 1956, **67**: 487-8, illus.

A preliminary account is given of a 2-year experiment to control black spot [scab] of apples and pears by the eradicant spray phenyl mercuric chloride over an area of about 170 acres. J.R.L.

1290. Hårdh, J. E.
Omenaruven leviämisestä ja torjunnasta.
**(The spread and control of apple scab.)**
[English summary ½ p.]
*Valt. Maatalousk, Julk.* **149**, 1956, pp. 15, bibl. 2, illus.

Irrespective of weather conditions the discharge of ascospores in 4 successive years began in the 3rd week of May, but the drier the weather in May and June, the later did discharge continue. Mercurial fungicides were highly effective in the dry summar of 1955 and good results were given by TMTD and dithiocarbamate. The percentage of fruit scab was progressively reduced by increasing concentrations of orthocide from 0·2 to 0·6%, but leaf scab responded uniformly over this range. Treatments timed according to warnings of spore discharge were very successful.—Agric. Res. Centre, Tikkurila, Finland.

1291. Nichols, C. W., and Wilson, E. E.
**An outbreak of European canker in California.**
*Plant Dis. Reptr*, 1956, **40**: 952-3, bibl. 9.

Twig infection of apples by *Nectria galligena* was apparently materially reduced by spraying with 10 : 10 : 100 bordeaux shortly after leaf fall.—Calif. Dep. Agric., Sacramento, and Univ. Calif., Davis.

1292. Wade, G. C., and Ward, J. R.
**The influence of fungicides and fruit maturity on the development of ripe spot and target rot of apples.**
*J. Aust. Inst. agric. Sci.*, 1956, **22**: 198-203, bibl. 6.

A lime sulphur-colloidal sulphur schedule was shown to give no significant control of ripe spot of apples (*Gloeosporium album*). Substitution of thiram or captan for early season applications gave very good control at picking time, but additional later applications were needed before control of the disease in stored fruit was obtained. While the fungicides may exert control by directly preventing infection it is suggested that they also slow down maturity changes in the fruit thereby causing an extension of the period of latent infection and delaying the appearance of spots. Early picking greatly reduces losses in cold storage, but its effect is not so marked with fruit in common storage. It is suggested that cold storage also delays the appearance of spots by slowing down maturity changes.—Tasm. Dep. Agric. J.R.L.

1293. Hunnam, D., Foulds, R. M., and Roney, E.
**Spray against gloeosporium—latest trials.**
*Grower*, 1957, **47**: 301-5.

Trials on the control of *Gloeosporium perennans* on apples have shown that growers should aim at maintaining a protective cover over the tree and fruit from July to September, up to 3 weeks before harvest. Programmes with 2 or 3 applications significantly reduced *Gloeosporium* infection. Zineb was less effective than captan for control.—Murphy chem. Co., Ltd., Wheathampstead, Herts.

1294. Wilson, G. J.
***Glomerella* infection in the Auckland district.**
*Orchard. N.Z.*, 1956, **29**(9): 27-31, illus.

A high incidence of bitter rot occurred in 1955–1956, mostly on Granny Smith but also on pears. Growers' spray programmes were studied in an attempt to relate the variations in incidence to them. Schedules including at least 2 sprays of bordeaux between January [N.B. Southern Hemisphere] and harvest satisfactorily controlled the disease.

1295. Tani, T., and Naito, N.
**On the nitrogen content of plants infected with several rust fungi.** [Japanese, with English summary ½ p.]
*Tech. Bull. Kagawa agric. Coll.*, 1956, **7**: 141-3, bibl. 6.

Pear leaves infected with pear rust (*Gymnosporangium haraeanum*) were found to contain only half the N of, and a higher C/N ratio than, healthy leaves. This was due to a decrease in water insoluble N. However, in the case of downy mildew of soya bean (*Peronospora manshurica*), downy mildew of cucumber (*Pseudoperonospora cubensis*), leaf blight of tomato (*Phytophthora infestans*) and leaf spot of "Mukuge" (*Cercospora hibisci*) the infected plants contained the same amount of N as the healthy ones. J.R.L.

1296. Wade, G. C.
**Investigations on brown rot of apricots caused by *Sclerotinia fructicola* (Wint.) Rehm. I. The occurrence of latent infection in fruit.**
*Aust. J. agric. Res.*, 1956, **7**: 504-15, bibl. 16, illus.

Evidence is presented that infection of apricot fruit with *Sclerotinia fructicola* may occur early in the fruit's development but remain latent until ripening commences. Evidence from culturing from green fruit is supported by the results of spraying experiments with fungicides and by inoculation experiments. Latent infection is confined to the epidermis and is not associated with any particular position on the fruit surface. Histological studies indicate that infection takes place through the stomata. It is tentatively suggested that an inhibitory substance is present in green fruit and maintains infections in a latent condition. The presence of a substance inhibitory towards a species of *Histoplasma* is demonstrated. This substance begins to disappear as ripening commences. [Author's summary.]—Dep. Agric., Hobart, Tas.

1297. Wade, G. C.
**Investigations on brown rot of apricots caused by *Sclerotinia fructicola* (Wint.) Rehm. II. The relationship of the potassium status of apricot trees to brown rot susceptibility.**
*Aust. J. agric. Res.*, 1956, **7**: 516-26, bibl. 15.

It is shown that under Tasmanian conditions there is a

negative relation between the potassium status of apricot trees and their susceptibility to brown rot. From regression equations calculated, it is suggested that trees with a potassium content of about 4·6% in oven-dry leaves would be resistant to brown rot. Difficulty was experienced in increasing the potassium content of the trees by soil or spray applications of potassium fertilizer, but when this was achieved some reduction in brown rot incidence occurred. Regular annual soil dressings of potassium chloride at the rate of 2 lb. per tree was the most satisfactory treatment tested. [Author's summary.]—Dep. Agric., Hobart, Tas.

1298. WADE, G. C.
**The control of brown rot of apricots by fungicides.**
*Tasm. J. Agric.*, 1956, **27**: 317-28, bibl. 7, illus.

Among fungicides tested in several seasons against brown rot [*Sclerotinia fructicola*] of apricots in Tasmania the best has been thiram applied at 1½ lb. 80% concentrate per 100 gal. Recent trials suggest that manam (manganese ethylene bisdithiocarbamate) may prove equally satisfactory. An early application between full bloom and calyx fall proved essential, its apparent effect being to control latent infection rather than reduce spore load. In some seasons improved control resulted from a cover spray applied when the fruit began to ripen. Bordeaux mixture applied at the pink bud stage gave some control of twig blight, but control was improved by the application of thiram at petal fall or calyx fall. Ziram, dichlone, captan, chloranil, copper fungicides, lauryl isoquinalinium bromide and phenyl mercuric triethanolamine lactate caused injury or russetting. There was no evidence that the addition of parathion to a thiram schedule improved brown rot control.

1299. ANGELL, H. R.
**Brown rot of stone fruits. IV. On the peach in wet and dry weather at harvest-time in 1956.**
*J. Aust. Inst. agric. Sci.*, 1956, **22**: 293-6, bibl. 4.

Very significant differences between the percentages of brown rot on light and heavy soil types were observed in the Shepparton area for the third successive year. They were associated this season with 3 inches of rain a week before maturity of the early peach, but with only 40 points of rain before maturity of mid-season varieties. These findings and their implications are discussed. [Authors summary]—Div. Pl. Indust., C.S.I.R.O., Canberra. [For Parts II and II see *H.A.*, 25: 2643 and 26: 383.]

1300. WENSLEY, R. N.
**The peach replant problem in Ontario. IV. Fungi associated with replant failure and their importance in fumigated and non-fumigated soils.**
*Canad. J. Bot.*, 1956, **34**: 967-81, bibl. 3, illus.

Soil fumigation with MC-2 (methyl bromide) inhibited many of the fungi found in the rhizosphere of peach replants. This chemical, as well as DD, induced greater growth of peach seedlings in most soils than either Dowfume W40 (ethylene dibromide) or CBP HI 806. Methyl bromide fumigation also permitted second year replants to develop free of root rot. On the other hand, the use of Dowfume W40, which was ineffective against the fungus flora, usually resulted in greater growth than that obtained in check soils. The soil fumigants used did not modify the depressing effect of toxins on the growth of replants in tree sites, although this effect gradually diminished with the passage of time. Fourteen species of fungi out of several hundred isolated from the rhizosphere and root tissues of peach replants in fumigated and non-fumigated peach orchard soils were found to be facultative parasites on the roots of peach seedlings when grown under greenhouse experimental conditions. Of these, *Fusarium equiseti*, *F. moniliforme*, *F. oxysporum*, *F. solani*, *Alternaria tenuis*, *Myrothecium verrucariae*, and members of Mycelia Sterilia were isolated most frequently while *Papularia sphaerosperma*, *Gliomastix convoluta*, and species of *Coniothyrium*, *Curvularia*, *Humicola*, *Peyronellaea*, and *Truncatella* appeared in the rhizosphere of certain peach trees and not in that of others. The experimental conditions most favorable to the infection of roots by these fungi proved to be low soil moisture combined with high soil temperature. [From author's abstract].—Bot. Pl. Path. Lab., Sci. Serv., Canada Dep. Agric., Ottawa. [For parts I, II and III see *H.A.*, 26: 1522, 1523 and 3473.]

1301. SMITH, H. C.
**Collar-rot of apricots, peaches and cherries.**
*Orchard. N.Z.*, 1956, **29**(9): 22-5, bibl. **1**, illus.

Attacks of *Phytophthora syringae* have recently been reported from several localities in New Zealand. Symptoms occurring on peach and apricot are described. In inoculation studies apricot, peach and cherry trees became infected but plums were resistant. The fungus is most active during cold, wet periods, and for control spraying the trunk and lower branches with a Cu spray [bordeaux or copper oxychloride] during the winter until leaf emergence is recommended. When gumming occurs the affected branches should be cut off and the wounds painted with copper oxychloride and petroleum jelly.—D.S.I.R., Lincoln.

1302. CONVERSE, R. H.
**Field tests of contact fungicides for pecan scab control.**
*Plant Dis. Reptr*, 1956, **40**: 961-4, bibl. 6.

Three materials that showed promise as contact fungicides—Corona CM-220, Puratized Agricultural Spray, and Dowicide G—were selected for a field test in 1955. Each material was applied twice as a dormant spray and was followed by 5 summer protectant sprays of ziram. All contact fungicides virtually eliminated the spore production of holdover stromata on which they were sprayed. Used consecutively, contact and protectant fungicides gave excellent control of scab during the growing season. Corona CM-220 used alone gave control similar to that given by the protectant fungicide, ziram, used alone. No phytotoxicity to the pecan trees was observed, and no As or Hg was found in the nuts harvested from the sprayed trees. [From author's summary. Okla A. & M. Coll.—[See also *H.A.*, 26: 2615.]

1303. HÅRDH, J. E.
Karviaishärmä ja sen torjunta. **(Gooseberry mildew and its control.)** [English summary ½ p.]
*Valt. Maatalousk. Julk.* **150**, 1956, pp. 12, bibl. 11, illus.

Mountain gooseberries and the Finnish varieties Hankkijan herkku, Hinnonmäen keltainen and Pellervo are mildew resistant. Serial spraying beginning immediately before flowering was ineffective with 40% aqueous formaldehyde used at 0·5%. Burgundy mixture at 1·5% controlled mildew but could be used only until fruit set as it adversely affected fruit flavour. Karathane used post-blossom after burgundy mixture or alone throughout the season gave effective control of mildew but caused berry russetting. Various copper fungicides, one of which was colloidal, gave insufficient control and the captan preparation Flit 406 was ineffective. Off-flavours were produced by Tolu and by the copper preparations Kuprijauhe and Perenox.—Agric. Res. Centre, Tikkurila.

1304. GEARD, I. D.
**Varietal susceptibility, control and seasonal incidence of raspberry leaf rust in Tasmania.**
*J. Aust. Inst. agric. Sci.*, 1956, **22**: 285-8, bibl. 6.

In observations made at the Summerlea Horticultural Research Station on the susceptibility of 7 raspberry varieties to leaf rust (*Phragmidium rubi-idaei*), Lloyd George and its seedling Neika were found to be very susceptible, whereas infection was negligible on the other varieties. In a spraying trial with Lloyd George the best control was given by 2 bordeaux sprays, one at the green tip stage and the other at the white bud stage. Captan, thiram and ferbam also gave significant control. A study of climatic data indicated that the high incidence of the disease in 1955/56 was associated with a period of exceptionally high humidity and temperature in early October when infection took place.—Dep. Agric., Hobart.

1305. MILLER, P. M., AND STODDARD, E. M.
**Hot-water treatment of fungi infecting strawberry roots.**
*Phytopathology*, 1956, **46**: 694-6, bibl. 3.

*Rhizoctonia solani* was killed at all growth stages by a temperature of 127° F. for 4 min., which was non-injurious to strawberry roots. *Verticillium albo-atrum* was much more heat-resistant, particularly in the sclerotial phase; thus root treatment is of doubtful value against it. *Fusarium* spp. required 7 min. at 149° F. to kill them and could not therefore be heat-controlled on the plants.—Conn. agric. Exp. Stat., New Haven.

1306. STAEHELIN, M., AEBI, H., AND BOLAY, A.
Essais de lutte contre le coitre de la vigne (*Coniella diplodiella* [Speg.] Pet. et Syd.). **((Control of white rot of vine.)** [German, English and Italian summaries ¼ p. each.]
*Landw. Jb. Schweiz*, 1956, **5**: 555-60, bibl. 5.

Chemical soil sterilization tests for control of *Coniella diplodiella* [see *H.A.*, 26: 1573] were not continued this year. Hail-damaged grapes were sprayed against *Coniella* and both captan and Mesulfan were very effective. Laboratory tests showed that any skin lesion in the grape was sufficient for entrance of the fungus.—Lausanne.

1307. TAYLOR, R. H.
***Cylindrocarpon radicicola* Wr.: the recording of a new fungus on grapes in Victoria.**
*J. Aust. Inst. agric. Sci.*, 1956, **22**: 291-2, bibl. 1, illus.

In December 1955 small black necrotic spots appeared scattered over pedicels and blossom ends of Ohanez grapes during a period of severe berry shedding. The causal fungus was identified as *Cylindrocarpon radicicola*. This is believed to be first record of this fungus on grapes. Tests showed that the fungus would invade the fruit only if the skin was ruptured, and that green berries were much more readily attacked than mature ones. The fungus was not considered to be a primary factor in the shedding of berries, but to be a secondary organism invading already weakened tissue. —Dep. Agric., Victoria.

1308. KRASIL'NIKOV, N. A., AND KUBLICKAJA, M. A.
**Microbial toxins and antitoxins in the development of chlorosis in vines.** [Russian.]
*Doklady Akad. Nauk S.S.S.R.*, 1956, **110**: 703-5, bibl. 4.

Experiments are described showing that vine chlorosis can be caused by *Fusarium* spp. occurring on or in the roots. Toxins produced by the fungi poison the tissues and disturb their metabolism. These toxins were found to be inactivated by the metabolites of certain strains of actinomycetes. When these antagonists develop abundantly in the vine rhizosphere they can neutralise the harmful action of the toxic fungi and prevent the development of chlorosis.

1309. FRANÇOT, P., AND MALBRUNOT, P.
Résultats récents d'observations et d'expérimentation dans la lutte contre le rougeot parasitaire *Brenner* en Champagne. **(Recent results of observations and trials on the control of rougeot disease in Champagne.)**
*Progr. agric. vitic.*, 1956, **146**: 178-88, 326-31, and 1957, **147**: 62-70, bibl. 12.

Observations are reported on climatic conditions which favour vine attack by *Pseudopeziza tracheiphila*. In 2 years' trials zineb at 0·5% was found to give the best control.

1310. G—., G.
Gli oidii delle piante legnose. **(Mildews of woody plants.)**
*Inf. fitopat.*, 1956, **6**: 290-2, illus.

Possible effects of climate on mildew infection of peach, apple and vine are discussed. No sign of *Uncinula necatrix* was found on shoots or inside buds of vines which survived the heavy frosts of Feb. 1956, and only mild attacks developed on these vines in subsequent months.

## *Nematodes.*

(*See also* 1371j, 1435, 1436.)

1311. BOSHER, J. E., AND NEWTON, W.
**Hot water treatment of apple stocks for the control of nematodes.**
From abstr. in *Phytopathology*, 1956, **46**: 634-5.

*Pratylenchus penetrans* has been found in a high proportion of clonal apple stocks recently introduced into British Columbia, although populations in general are small. Nematodes in large and small stocks of Malling VII and IX were destroyed by root immersion in hot water, the required duration of immersion depending on size of stocks. Treatments were more effective when stocks were soaked for 2 hours in water at 70° F. before treatment. The least injury by treatments occurred when the plants were taken from cold storage at 34°–38° F., treated in January, and returned to cold storage until spring planting. The roots were protected from secondary invasion by fungi by a fungicidal dip after treatment.

1312. Seinhorst, J. W., and Sauer, M. R.
**Eelworm attacks on vines in the Murray Valley Irrigation Area.**
*J. Aust. Inst. agric. Sci.*, 1956, **22**: 296-9, bibl. 2, illus.

Diseases of vines caused by 4 nematode species, *Meloidogyne javanica*, *Pratylenchus vulnus*, *Pratylenchus scribneri* and *Tylenchulus semipenetrans*, are described. Two of these nematodes, *Pratylenchus scribneri* and *Tylenchulus semipenetrans*, have not previously been reported from vines. [Authors' summary.]—Commonw. Res. Stat., Merbein.

1313. van der Linde, W. J.
**The *Meloidogyne* problem in South Africa.**
*Nematologica*, 1956, **1**: 177-83, bibl. 4.

Roots of infested peach trees were fumigated with methyl bromide, and the trees were examined for nematodes after 9 months' growth in sterilized soil. Trees fumigated for 4 or 6 hours were reinfested; after 8 hours' fumigation new root growth was clean, but 3 out of 15 trees died; after 12 hours' fumigation all the trees died. The species of *Meloidogyne* were not determined.

1314. Gilpatrick, J. D., and others.
**The effect of placement depth on the activity of Nemagon.**
*Phytopathology*, 1956, **46**: 529-31, bibl. 10.

Liquid Nemagon injected 2 in. deep in sandy soil gave almost complete control of the root knot nematode, *Meloidogyne incognita* var. *acrita*, in the surface 12 in. Deeper placement was required for deeper penetration, but injections at 10 and 12 in. failed to control a few nematodes near the surface. For most purposes a placement 6–8 in. deep is recommended for both penetration and surface clean up. At application depths of 4–8 in. Nemagon impregnated on Attaclay granules gave as good control in the upper 24 in. of soil as did the liquid. In the 24 to 36 in. zone, the liquid was slightly more effective than the granules. [From authors' summary.]—Shell Devel. Co., agric. Res. Div., Modesto, Calif.

## *Mites.*

(*See also* 1196, 1371w.)

1315. Cutright, C. R.
**A three-year field study of a mite population resistant to parathion.**
*Res. Circ. Ohio agric. Exp. Stat.* **37**, 1956, pp. 12, illus.

In an apple orchard a population of *Metatetranychus ulmi*, which was resistant to parathion, was readily controlled by demeton and related systemics and also by non-phosphorus acaricides. J.R.L.

1316. Fritzsche, R.
Zur Problematik der Spinnmilbenbekämpfung. **(Problems of spider mite control.)**
*NachrBl. dtsch. PflSchDienst, Berlin*, 1956, **10**: 230-4, bibl. 13.

The continuing increase in spider mite populations in recent years is the result of several factors, of which the climatic factor is the most important. The obstacles to spider mite control are discussed.

1317. Heikinheimo, O.
Kehrääjäpunkeista ja niiden torjunnasta uusimpien tutkimusten valossa. **(Spider mites and their latest control methods.)** [German summary 14 lines.]
*Maatalous ja Koetoim.*, Part 10, 1956, pp. 150-61, bibl. 8, illus.

A review of foreign work on mites (*Metatetranychus pilosus* and *Tetranychus urticae*) is followed by tabulated results of experiments at Tikkurila and elsewhere in glasshouses and orchards [German captions being provided]. [From author's summary.]—Dep. Pl. Path., agric. Res. Centre, Tikkurila.

1318. Madsen, H. F., and Hoyt, S. C.
**Control of European red mite.**
*Calif. Agric.*, 1957, **11**(1): 6, 15-16, illus.

Among the newer acaricides tested against red mites [*Metatetranychus ulmi*] on apples and pears Genite-923, Mitox and Trithion applied in the pink or cluster bud stages have given promising results [see *H.A.*, 26: 2625], but in some areas there is evidence that, as has occurred previously with Ovotran, mite strains resistant to Genite-923 are developing.

1319. Boots Pure Drug Co. Ltd.
**Technical communication on Chlorparacide. Part 1. Biological data and chemistry of Chlorparacide. Part 2. Field application of Chlorparacide.**
[*Publs*], *Boots Pure Drug Co. Ltd., Nottingham*, [1956], pp. 12, bibl. 6; pp. 14, bibl. 4.

*Part 1.* An account is given of the activity of Chlorparacide (chlorbenside) against tetranychid mites, especially the fruit tree red spider mite (*Metatetranychus ulmi*) and the greenhouse red spider mite (*Tetranychus telarius*). Its insecticidal activity, phytotoxicity, taint, and mammalian toxicity are discussed. The chemical structure of the substance and method of microanalysis are given. *Part 2.* Recommendations are made for the use of chlorbenside against red spider mite in the orchard and against greenhouse red spider mite outdoors and under glass. It can be formulated as a spray, dust or aerosol. J.R.L.

1320. Philipp, W.
Verstärktes Auftreten der Zwetschengallmilbe, *Aceria* (=*Eriophyes*) *phloeocoptes* Nal. **(Heavy infestation by the plum gall mite.)** [English summary 4 lines.]
*Z. PflKrankh.*, 1957, **64**: 35-8, bibl. 3, illus.

Symptoms caused by plum gall mite in different varieties of *Prunus domestica* in the upper Rhine valley

are described. The susceptibility of the varieties, degree of damage and preventive measures are discussed.

1321. PERRET, J.
Un ennemi méconnu de l'amandier au Maroc: l'araignée rouge Bryobie. (**A little-known pest of almond trees in Morocco: the *Bryobia* mite.**)
*Terre maroc.*, 1956, **30**: 375-7.

*Bryobia praetiosa* is a serious pest in non-irrigated peach and almond orchards in Morocco. Satisfactory control has been achieved by spraying immediately before bud-burst with highly viscous mineral oil.

1322. KUNZ, G.
Zur Biologie und Bekämpfung der Stachelbeermilbe [*Bryobia praetiosa* Koch] an Stachelbeeren. (**On the biology and control of the gooseberry red spider mite on gooseberries.**)
*Dtsch. Gartenb.*, 1956, **3**: 299-301, bibl. 7, illus.

Very satisfactory control of *Bryobia praetiosa* on gooseberry was achieved without injury to the host by either of two treatments: a single dormant application of an oil spray (Geol, 3%), or two applications of parathion immediately after hatching of the majority of larvae and 10–16 days later. In the presence of winter eggs on the fruiting wood the dormant spray seems preferable, a concentration of 1·5–2% being considered adequate. The trials were carried out in Saxony, Germany, in 1953–55.

1323. HUFFAKER, C. B., AND KENNETT, C. E.
**Experimental studies on predation: predation and cyclamen-mite populations on strawberries in California.**
*Hilgardia*, 1956, **26**: 191-222, bibl. 57.

A native predatory mite, *Typhlodromus* sp., normally gives good control of cyclamen mite, *Tarsonemus pallidus*, in the third and fourth years of strawberry plantations. Delays in the natural invasion of the predator mean that control is only sporadic in the second year. In field trials stocking of strawberry plantations with the predator late in the first or early in the second year gave consistent control of the mite. The implication of the results for theories of population dynamics is discussed.—Calif. agric. Exp. Stat., Berkeley.

### *Insect pests.*

(*See also* 1371e, y, 1785, 1786, 1859, 1973.)

1324. WHELLAN, J. A.
**The work of the Entomological Branch of the Department of Research and Specialist Services [Ministry of Agriculture, Rhodesia].**
*Rhod. agric. J.*, 1956, **53**: 946-51.

Regulations for pest prevention, mainly codling moth and tobacco pests; studies on the army worm (*Laphygma exempta*) and fruit-piercing moths (unspecified).

1325. VOGEL, W., AND WILDBOLZ, T.
Die Ergebnisse der Astprobenuntersuchungen im Winter 1956/57. (**Results of branch-sampling investigations in the winter of 1956-57.**)
*Schweiz. Z. Obst- u. Weinb.*, 1957, **66**: 68-73.

Distribution of the cherry blossom moth, apple aphis (*Rhopalosiphum insertum*), winter moth, tortrix moth, ermine moth, sucker (*Psylla mali*), red spider mite and scale insects in Swiss orchards in 1956–7. Brief notes on optimal times of application for various insecticidal sprays.

1326. SCHNEIDER, F., WILDBOLZ, T., AND VOGEL, W.
Die Apfelgraslaus (*Rhopalosiphum insertum* Wlk.), eine sehr häufige, jedoch noch wenig bekannte Doppelgängerin der Grünen Apfellaus (*Aphis pomi* de Geer). (**The oat-apple aphid, a very common but as yet little known double of the green apple aphid.**)
*Schweiz. Z. Obst- u. Weinb.*, 1957, **66**: 8-17, bibl. 19, illus.

The oat-apple aphid (*Rhopalosiphum insertum*), commonly confused with the green apple aphid (*Aphis pomi*), can cause serious damage to apple trees in the case of a mass incidence. Its numbers are normally kept down by predators, but winter washes will give good control if necessary. The biology of the aphid and its identification are discussed.—Wädenswil.

1327. CORONADO P., R.
Control quimico y biológico del pulgón lanigero del manzano. (**Chemical and biological control of woolly aphids on apples.**)
*Agric. téc. México*, 1955, **1**(2): 10, 47, illus.

Spraying trunks with BHC and root fumigation with paradichlorobenzene or carbon disulphide have not been consistently effective. The parasite *Aphelinus mali* has been successfully established in some places and has given excellent control.

1328. DALMASSO, G.
Lutte contre le phylloxera (à l'exclusion de l'emploi des porte-greffes résistants). Rapport général pour l'Europe. (**Control of phylloxera (excluding the use of resistant rootstocks). General report for Europe.**)
VEGA, J.
Idem. Rapport général pour l'Amérique latine. (**Idem. General report for Latin America.**)
*Bull. Off. int. Vin*, 1956, **29**(308): 5-30, bibl. 9, and 31-42.

In this section of the report of the 8th International Congress on Vines and Wines, held at Santiago, Chile (Mar.–Apr. 1956), the authors discuss the history of phylloxera infestation, factors affecting its spread, control measures (chemical, biological and cultural) and resistant varieties for use as scions.

1329. ŁĘSKI, R.
Doświadczenia nad zwalczaniem kwieciaka jabłkowca (*Anthonomus pomorum* L.) i możliwościami połączenia zabiegu z opryskiem zimowym. (**Experiments to combine control of apple blossom weevil with dormant sprays.**) [Russian and English summaries ½ p. each.]
*Prace Inst. Sadown. Skierniewice*, 1955, **1**: 123-37, bibl. 22.

Sprays of 0·1% DDT applied just before or just after bud burst gave good control of apple blossom weevil, and the number of infested blossoms was reduced by

90%. Similar results were obtained by a combination spray of 0·1% DDT plus 0·05–0·3% BHC, or plus 0·5% DNC. DDT in combination with tar oil sprays was not toxic to apple blossom weevil. No control was obtained with BHC applied before or after bud burst, in spite of its efficiency in laboratory tests.—Res. Inst. Pomol., Nowa Wieś.

1330. KLINGLER, J.
Vorbeugende Behandlung von Rebenneuanlagen gegen den gefurchten Dickmaulrüssler. **(Preventive treatment of replanted vineyards against the black vine weevil.)**
*Schweiz. Z. Obst- u. Weinb.*, 1957, **66**: 91-4, bibl. 2, illus.

Practically complete control of *Otiorrhynchus sulcatus* adults in the first year and larvae in the second year was achieved by broadcasting and harrowing in 5% aldrin at 0·7, 1·5 or 2 kg. per are immediately before planting. The suggested optimal application is 1–1·5 kg. mixed with 5–10 times its weight of sand. Treatment of the soil round individual plants with various amounts of this or a $\gamma$ BHC product was ineffective. [See also *H.A.*, 26: 3551.]

1331. DE ROSA, M.
Il balanino delle nocciole. **(The nut weevil.)**
*Ital. agric.*, 1956, **93**: 931-6, illus.

Of the 8 insecticides tested against *Balaninus nucum*, dieldrin as 5% dust or 10% spray gave the best control and DDT as 5–10% dust or 30% spray gave good results. In every case two treatments were given with an interval of 9–14 days. The ovicidal and larvicidal action of parathion absorbed by the nut shell before hardening is to be studied further.

1332. JOHNSON, W. T.
**The Asiatic oak weevil and other insects causing damage to chestnut foliage in Maryland.**
*J. econ. Ent.*, 1956, **49**: 717-18, bibl. 3.

Five species are discussed and the control of the 2 most important ones is mentioned. The Asiatic oak weevil, *Cyrtepistomus castaneus*, is stated to be easy to kill by wettable DDT sprays, and oil fogs containing DDT or lindane. Against the mite, *Oligonychus bicolor*, one spray application of nicotine sulphate, parathion, aramite or malathion was found very effective.

1333. SHEDLEY, D. G.
**Apple curculio. Preliminary report of an experiment.**
*J. Agric. W. Aust.*, 1956, **5**: 599.

In experiments during 1955/56 to control apple curculio (*Otiorrhynchus cribricollis*) dieldrin and Gammexane were applied to the trunks and dieldrin, lindane, methoxychlor, lead arsenate and malathion as foliage sprays. The two trunk treatments and the dieldrin spray were most effective, but the latter is not considered suitable because of the danger of increasing the population of *Bryobia* mites. J.R.L.

1334. WILDBOLZ, T., AND HENAUER, A.
Die Bekämpfung der Fruchtwanzen auf Glockenapfel. **(Control of fruit bugs on the apple variety Glockenapfel.)**
*Schweiz. Z. Obst- u. Weinb.*, 1957, **66**: 81-4, bibl. 1.

The biology of *Psallus ambiguus* is described. Winter spraying with insecticides was ineffective because the eggs were in deep bark fissures. Treatment with phosphoric esters + oil at bud-burst, or with the esters alone before or immediately after flowering, gave good control.

1335. VEREŠČAGIN, B. V., GUSEVA, T. I., AND ABRAMOVA, L. A.
**Leaf hoppers and their control.** [Russian.]
*Sad i Ogorod*, 1956, No. 12, pp. 62-3, illus.

*Ceresa bubalus* was observed in the U.S.S.R. for the first time in Moldavia in 1954. It was found on plum trees, but it also attacks apple, pear, apricot, quince, cherry and walnut, causing the most serious damage in the nursery and newly planted orchards. For control removal of infested branches and destruction of weeds is recommended. Of chemical methods tested a 4% suspension of 5·5% DDT or 12% BHC dusts and a 0·4% emulsion of the new organo-phosphorus preparation, vofatox, were found effective against the emerging larvae.

1336. TURICA, A.
*Dasyneura* (*Perrisia*) *mali* Kieffer, enrulador de las hojas del manzano. **(*Dasyneura* (*Perrisia*) *mali*, leaf roller of apple trees.)**
*Idia*, 1956, No. 103, pp. 14-22, bibl. 11, illus.

Excellent control was achieved with either E 605 (Folidol) at 0·04%, nicotine sulphate at 0·3%, E 1059 (Systox) at 0·03% or a mixture of the nicotine sulphate with 0·5% mineral oil. Two treatments were necessary for each of the first 3 generations of the pest. DDT at 0·25% and BHC at 0·4% were ineffective. The wasp, *Brachygastra lecheguana*, effectively cleared the leaves of larvae.

1337. GEORGHIOU, G. P.
**Control of "medfly" on apricots.**
*Countryman, Nicosia*, Sept. 1956, p. 18.

In large-scale demonstrations in several localities Mediterranean fruit fly infestation was reduced to nil on the late-maturing apricot variety Dipla by bait sprays of 1% actual malathion in 10% sugar solution. The bait was applied 5 times at 10-day intervals to about 8 sq. ft. of foliage on each tree. On control trees infestation ranged from 2 to 6%.

1338. MARTÍNEZ ANDREU, A.
La mosca del Mediterráneo, *Ceratitis capitata* (Wied). **(The Mediterranean fruit fly, *Ceratitis capitata*.)**
*Rev. Agric. Habana*, 1956, **39**(2): 34-46, illus.

Distribution, food plants, biology, legislation in U.S.A. and Cuba, traps, insecticidal sprays (DDT), poisoned baits (Malathion, lead arsenate and sodium fluosilicate).

1339. BALEVSKI, A.
***Aporia crataegi*, a pest of fruit in Bulgaria and its control.** [Bulgarian with English summary.]
*J. sci. Res. Inst. Minist. Agric., Sofia*, 1955, No. 2, pp. 121-72, from abstr. in *Z. PflKrankh.*, 1956, **63**: 679.

Biology, ecology and control of *Aporia crataegi* were studied 1945–47, during which period the pest caused serious damage to fruit trees in south-western Bulgaria.

Satisfactory control was obtained with a single summer application of DDT, BHC, ester preparations or nicotine, if timed to coincide with the hatching of 10–25% of the eggs.

1340. Djulizibarić, T.
Ogledi za suzbijanje gubarevih legala. **(Experiments on controlling gipsy moth egg clusters.)** [English summary 1 p.]
*Zasht. Bilja*, 1956, No. 34, pp. 21-35, bibl. 7, illus.

Dinosan (DNOC), Rapein (DDT) and kerosene have been found satisfactory against gypsy moth, *Lymantria dispar*, eggs. Dinosan applied in orchards at a 2% concentration is considered particularly suitable on account of its low price and effectiveness against other pests such as San José scale. Application by a natural sponge tied to a pole was better than any other method.

1341. Tešić, T.
Rezultati ispitivanja dejstva nekih insekticida na legla gubara. **(The effect of some insecticides on gipsy moth egg clusters.)** [English summary ½ p.]
*Zasht. Bilja*, 1956, No. 34, pp. 37-44, bibl. 1.

DDT 33% emulsion, lindane, Rapein (DDT) and kerosene applied to gipsy moth clusters shortly before the eggs hatched gave very satisfactory results and some other materials were also found effective. Spraying the egg clusters was better than soaking as it speeded up work and reduced the cost of the treatment.

1342. Smith, L. C., and Lohmeyer, V. K.
**DDT-resistant codling moth. A report on the 1955-56 control trials.**
*J. Dep. Agric. S. Aust.*, 1956, **60**: 185-7, bibl. 1.

Parathion, malathion and diazinon were found to give effective control of the DDT-resistant strain of codling moth. Frequent applications are necessary, but a possible method of reducing the number required is to time applications on the basis of lure pot catches. [For earlier results see *H.A.*, 26: 421.]

1343. Salvaterra, G.
La ricamatrice della frutta, *Capua reticulana* Hübner. **(The summer fruit tortricid, *Capua reticulana [Adoxophyes orana].)***
*Ital. agric.*, 1956, **93**: 893-7, illus.

Distribution in Italy, biology and control are described. Winter spraying with yellow mineral oils or anthracene oils was not satisfactory for control. The effects of the former were improved and of the latter reduced in activity when rain fell a few days after application. Spring and summer applications of phosphoric esters gave the best results when used at concentrations ⅓ higher than those recommended for red-spider mite. Lead arsenate was effective when used as for control of codling moth. Wetting agents were necessary in all treatments.

1344. Savary, A., and Baggiolini, M.
La pyrale de la vigne: *Sparganothis pilleriana* Schiff. (Lép. tortricide), ravageur nouveau des fraisières valaisannes. **(The vine pyralid moth, a new pest of strawberry plants in Valais.)**
*Rev. romande Agric. Vitic.*, 1956, **12**: 120-3, bibl. 5, illus.

The morphology and life-history of the vine pyralid moth is described. The application of contact insecticides during May and June by growers was not effective for control. In tests of ovicides the highest egg mortality (55%) was obtained with a parathion emulsion. The young larvae may possibly be controlled by 2 or 3 applications of a persistent or a contact insecticide, starting about 10 days after the start of hatching.—Stat. fed. essais agric., Lausanne.

1345. Zangheri, S., and Michieli, G.
Esperienze di lotta contro le tignole dell'uva (*Clysia ambiguella* Hb. e *Polychrosis botrana* Schiff.) con dieldrin ed endrin nel Veneto. **(Experiments in Venetia on control of the grape moths *Clysia ambiguella* and *Polychrosis botrana* with dieldrin and endrin.)**
*Agric. Venezie*, 1956, **10**: 599-610, bibl. 9, illus.

Three treatments at 8–12 day intervals against each of the first 2 generations of the pests showed moderate effectiveness of dieldrin and high effectiveness of endrin, both being used at 100 or 150 g. per 100 l. of water. (No tests were made against the 3rd generation.) A sticker was necessary for treatments after fruit set, but not during flowering. There was no injury to the vines from any of the treatments.—Ist. Entomol., Univ. Padua.

1346. Brock, A. M.
**Observations on the biology of the black currant sawfly.**
*Plant Path.*, 1956, **5**: 144-6, bibl. 1.

*Nematus olfaciens* has recently caused severe defoliation on black currants in many English counties. Observations on damage, biology and parasites are recorded. For control sprays of DDT emulsion, liquid derris or TEPP are recommended. Hand picking of caterpillars and leaves bearing eggs can be carried out on a small scale.—N.A.A.S., Shardlow.

1347. Cosmo, I.
Aspetti e problemi della viticoltura e dell' enologia del Cile. Seconda parte. **(Aspects and problems of viticulture and enology in Chile. Part 2.)**
*Riv. Vitic. Enol.*, 1956, **9**: 379-94, illus.

Much of this continuation of a report on the author's observations in Chile [noted *H.A.*, 27: 241h] concerns the damage done by the vine root scale insect, *Margarodes vitium*. The pest is apparently only serious in alkaline soils, or those irrigated with alkaline water. Cysts remain viable for as long as 17 years. So far no effective method of control has been found. Some vine varieties are more resistant than others.

1348. (Samuels, C. E.)
**Wetting agent washes thrips from processing berries.**
*Bett. Fruit*, 1956, **51**(5): 18.
(Brekke, J. E., and others.)
**Getting thrips off berries.**
*Agric. Res. Wash.*, 1956, **5**(4): 15.

The addition of less than 1% of alkyl aryl sulphonate to a water bath was sufficient to remove thrips from raspberries, blackberries and other cane fruits, when dipped. The berries should be washed and dried after

treatment. The wetting agent had no effect on quality of fruit or preserves.

### *Other pests.*

(*See also* 1371 l.)

1349. White, D. G., and Frear, D. E. H.
**A comparison of four methods to kill orchard mice.**
*Progr. Rep. Pa agric. Exp. Stat.* **158**, 1956, pp. 2, bibl. 3, illus.

In an apple orchard in which the blue grass sod seemed to be heavily infested with meadow mice the following 4 treatments were applied in November 1955: zinc phosphide on apple cubes placed by trail builder, 2-diphenylacetyl-1,3-indandione on wheat placed in the same way, endrin solution flushed through trail builder, and the same plus wheat. The number of mice trapped subsequently indicated that 2-diphenylacetyl-1,3-indandione was the most promising material and should be further tested at different concentrations and on different baiting materials. The endrin solution applied in these trials through a trail builder was not so effective as when used as a ground spray.

1350. White, D. G., Frear, D. E. H., and Wingard, R. G.
**Rabbit repellents for dormant apple trees.**
*Progr. Rep. Pa agric. Exp. Stat.* **157**, 1956, pp. 13, bibl. 4, illus.

Nine materials applied to the trunks of young apple trees were tested as repellents for cottontail rabbits. A proprietary material called "Ringwood" [containing trinitrobenzeneaniline] was the best and nicotine sulfate in asphalt paint was practically as good. "Ringwood" was relatively expensive, however, and the asphalt paint was rather messy. Under natural conditions probably rosin in alcohol or lime sulfur would be satisfactory repellents and would be less troublesome and less expensive than many others. [From author's summary.]

1351. (van den Bruel, —.)
Premiers résultats de l'étude comparée des hélicides. (**Preliminary results of comparative studies with slug poisons.**)
*Parasitica*, 1956, **12**: 135-6.

Parathion was ineffective for slug control. Cyanamide at 500 kg. per ha. was effective even at low temperatures. [See also *H.A.*, 26: 2757.] Metaldehyde was effective only at rates of 25 kg. of pure material per ha. or higher, and not at low temperatures.

### *Biological control.*

1352. Hinton, H. E.
**Biological control of pests. Some considerations.**
*Sci. Progr.*, 1957, **45**: 11-26, bibl. 140.

The author contrasts repetitive biological control, where say bacteria or viruses are produced in the laboratory for yearly spraying, and non-repetitive biological control, where the parasite or predator is released once and then left to deal adequately or inadequately with the disease or pest in question according to environmental circumstances. The author cites a large number of instances of non-repetitive biological control, most of which concern enemies of horticultural or plantation crops. Among the enemies cited are woolly aphis, citrus black fly, nigra scale, coconut scale, cottony cushion scale, citrophilus mealybug, black scale, mulberry scale, sugar cane leaf hopper, coconut leaf-mining beetle, levuana moth (of coconuts), *Laphygma exempta*, oriental moth of ornamentals, and the weeds *Cordia macrostachya* and *Opuntia* species.

### *Antibiotics.*

(*See also* 1371h, m, r, 1432, 1433, 1547, 1636, 1710, 1783d.)

1353. Kutschajewa, A. G., and Jegorowa, S. A.
Über das Eindringen von Antibiotika in mehrjährige Pflanzen. (**On the absorption of antibiotics by perennial plants.** [Russian.]
*Mikrobiologija*, 1955, **24**: 315-20, from abstr. in *Zbl. Bakt., II. Abt.*, 1956, **109**: 648.

The experimental plants shown to absorb 6 different antibiotics included peach, apricot, cherry, plum, rose and lilac. Of the compounds tested penicillin travelled farthest, viz. up to 20 cm. above the place on the leaf or shoot treated externally. In apricot the antibiotic action of penicillin was prolonged, but in cherry it was of short duration.

1354. Dye, M. H.
**Studies on the uptake and translocation of streptomycin by peach seedlings.**
*Ann. appl. Biol.*, 1956, **44**: 567-75, bibl. 12, illus.

Measurements of the antibiotic activity in the foliage of peach seedlings, kept with their roots in mineral nutrient solutions containing streptomycin, showed that streptomycin passed into the foliage and sometimes reached concentrations above those of the solutions surrounding the roots. The amount of the antibiotic in leaves varied with the time that roots were kept in the solutions and with the streptomycin concentrations of the solutions. Lower leaves contained much more than upper leaves. Adding macerated leaf tissue to streptomycin solutions decreased the amount of streptomycin detectable in the supernatant liquid more than could be accounted for by dilution or alteration of pH. Streptomycin first affected plants by decreasing apical growth, but at higher concentrations it caused chlorotic and necrotic areas on leaves and stems. [Author's abstract].—Plant Dis. Div., D.S.I.R., Auckland, N.Z. [See also *H.A.*, 27: 277.]

1355. Naito, N., and Tani, T.
**Purification and properties of an antibiotic produced by *Gloeosporium olivarum* in culture media supplied with sodium 2,4-dichlorophenoxyacetate.** [Japanese, with English summary 1½ p.]
*Tech. Bull. Kagawa agric. Coll.*, 1955, **7**: 41-50, bibl. 17, illus.

Evidence is given to show that the inhibitory activity of 2,4-D to *G. olivarum* is not a direct effect of the chemical but is due to an antibiotic produced in its presence. Mycelial growth of *G. olivarum* was completely inhibited at 1 : 5,000 of the purified antibiotic, and was retarded at 1 : 50,000; conidiospores did not germinate at 1 : 7,500. The growth of *Pythium*

*aphanidermatum* was suppressed at 1 : 5,000, the minimum concentration for inhibitory activity probably being about 1 : 50,000. In other experiments it was shown that the antibiotic was toxic to 5 other species of phytopathogenic fungi and 3 species of bacteria.

J.R.L.

### *Fungicides and insecticides.*

(*See also* 1371c, p, 1434.)

1356. Parsons, W., and Martin, E. C.
**Some effects of fungicides on the honeybee.**
*Quart. Bull. Mich. agric. Exp. Stat.*, 1956, **39**: 248-58, bibl. 11, illus.

Of 14 fungicides commonly used in orchards the most toxic to bees were the organic mercury compounds, especially Puratized and Tag 331. Toxicity was slight to nil in dithiocarbamates, copper-zinc chromate, captan and thiram. Zineb (Dithane Z-78) appeared to prolong the life of the bees.

1357. Schuldt, P. H., and Wolf, C. N.
**Fungitoxicity of substituted s-triazines.**
*Contr. Boyce Thompson Inst.*, 1956, **18**: 377-93, bibl. 17.

Tested against *Alternaria oleracea*, *Monilinia fructicola*, *Alternaria solani*, *Phytophthora infestans*, *Pythium* sp., and other soil-inhabiting fungi.

1358. Langbein, H.
Erfahrungen mit zwei neuen organischen Fungiziden im Weinbau. **(Observations on two new organic fungicides applied in the vineyard.)**
*Weinberg u. Keller*, 1956, **3**: 5, from abstr. in *Mitt. Klosterneuburg*, *Ser. A*, 1956, **6**: 326-7.

In one year's, but large-scale, trials two thiram preparations plus wettable sulphur were compared with copper fungicides. The organic compounds proved equal to copper for downy mildew control, superior for "Roter Brenner" (*Pseudopeziza tracheiphila*) control and inferior for oidium and grey mould control. Yields of thiram-treated plots were 25 and 18% higher than those of plots treated with copper.

1359. Minárik, E.
Prispevok k otazke vplyvu fungicidov a insekticidov na kvasenie hroznoveho mustu. **(On the effect of fungicides and insecticides on the fermentation of grape musts.)**
*Biologia*, 1956, **11**: 523, from abstr. in *Mitt. Klosterneuburg*, *Ser. A*, 1956, **6**: 330.

Small amounts of bordeaux mixture seriously inhibited fermentation, whereas 3 sulphur preparations affected the process only at high concentrations. The insecticides Dynozid and Dynol had no influence on fermentation.

1360. Linsley, E. G. [Editor].
**Evaluation of certain acaricides and insecticides for effectiveness, residues and influence on crop flavor.**
*Hilgardia*, 1956, **26**: 1-106, bibls.

The 7 articles which form this symposium are preceded by an introductory and summary account by the editor. The following articles are included: Field tests of acaricides for control of mites on pears and apples, by H. F. Madsen and A. D. Borden; Field tests of acaricides for control of spider mites on almonds and peaches, by F. M. Summers; Effects of acaricides on flavor of almonds and canned fruits, by E. Hinreiner and M. Simone; Harvest residues of acaricides used on deciduous fruits, by R. P. Miskus, W. R. Erwin, and W. M. Hoskins; Residual soil insecticides for the control of wireworms affecting vegetable crops, by W. H. Lange, and E. C. Carlson; Effects of soil insecticides on flavor of vegetable crops, by E. Hinreiner and M. Simone; and Harvest residues of insecticides in vegetable and field crops resulting from foliage and soil application, by W. R. Erwin, R. P. Miskus, and W. M. Hoskins. It has been shown that several acaricides will give satisfactory control of the tetranychid mites affecting apples, pears, peaches and almonds in California. Several soil insecticides applied broadcast at different rates demonstrated initial and residual effects on wireworms damaging potatoes and carrots. In laboratory tests considerable variations were found in the speed of action of the insecticides used, and in their residual effects in soils of different textural classes.

1361. MacPhee, A. W., and Sanford, K. H.
**The influence of spray programs on the fauna of apple orchards in Nova Scotia. X. Supplement to VII. Effects on some beneficial arthropods.**
*Canad. Ent.*, 1956, **88**: 631-4, bibl. 1.

Additional information collected between 1953 and 1955 is tabulated with information already published [*H.A.*, 24: 2520]. Malathion, parathion, sulphur, Perthane and DDT had drastic effects on natural enemies of orchard pests; nicotine sulphate, lead arsenate, summer oil, Ovotran, Phygon, ferbam, ryania, Genite 923, fixed nicotine and Aramite were harmful to some species and innocuous to others; bordeaux, captan, Chlorocide, Erad, glyodin, Puratized and cryolite were relatively harmless to parasites and predators.—Sci. Serv. Lab., Kentville, N.S.

1362. Beran, F., and Neururer, J.
Zur Kenntnis der Wirkung von Pflanzenschutzmitteln auf die Honigbiene (*Apis mellifica* L.). 2. Mitteilung: Bienengefährlichkeit von Pflanzenschutzmitteln. **(A study of the effect of pesticides on honey bees. 2. Pesticide danger to bees.)** [English summary ½ p.]
*PflSch. Ber. Wien.*, 1956, **17**: 113-90, bibl. 51, illus.

Flowering crops were sprayed with several pesticides in greenhouse and field studies to determine their effects on honey-bees. Results were compared with the toxicological tests which have already been reported [*H.A.*, 26: 1626]. The "danger index sum", used as a basis for pesticide classification, corresponded fairly well with the results of field trials. The pesticides most commonly used are divided into 3 groups according to their degree of harmfulness to bees. Measures for the protection of honey bees from the harmful effects of pesticides are suggested.—Bundesanst. PflSchutz, Vienna.

1363. Rüppold, H.
Experimentelle Beiträge zum Wirkungsmechanismus innertherapeutisch wirksamer Präparate. Ein Beitrag zür inneren Therapie der Pflanze. **(Experimental contributions to the action of systemic insecticides. A contribution on the internal therapy of plants.)**
Reprinted from *Wiss. Z. Univ. Halle*, 1955, **5**: 219-49, bibl. 103, illus.

Testing the systemic and insecticidal action of trialkyl thiophosphate compounds the author found the Wolfen product W6510 to be as effective as systox but slightly less toxic to mammals. In the field and in the laboratory good results were obtained against *Doralis fabae* on broad bean, *Hyalopterus arundinis* on plum, *Cryptomyzus ribis* on currants, *Phorodon pruni* on hop and red spider mites on plum and carnation. The preparation can be applied as a spray (0·03%) or by watering the ground, the residual effect lasting for 3–4 weeks and 4–6 weeks respectively. The dosages recommended for watering are 3 litre/sq. m. in the field, 4–6 l. per ¼-standard fruit tree and 3 l. per hop plant. No plant injury occurred in these experiments. The aphids were studied in small plastic chambers attached by clips to the leaf *in situ*, a method which is described and illustrated.—Phytopath. Inst., Martin-Luther-Univ. Halle-Wittenberg.

1364. Finkenbrink, W.
Über Thiodan, ein neues synthetisches Insektizid. **(On Thiodan, a new synthetic insecticide.)**
*NachrBl. dtsch. PflschDienst., Braunschweig*, 1956, **8**: 183-5.

The insecticide Thiodan is a sulphur-containing heterocyclic hydrocarbon compound (1,2,3,4,7,7-hexachlorbicyclo-[2,2,1]-hepten-5,6-bisoxymethylenesulphite) recently developed in Germany. It has a wide range of action against insect pests, many of them horticultural; it is non-injurious to plants and bees, but shows a certain toxicity to warm-blooded animals. The concentrations proposed for the control of 46 pests vary from 0·02% to 0·1%. Nineteen insects are listed which so far have been found to respond to dust applications of the insecticide. It is still uncertain whether Thiodan acts as a stomach or a contact poison.

1365. Wildbolz, T.
Versuche mit den Oleo-Phosphorsäureester-Präparaten im Jahre 1956. **(Studies with combined oil and phosphoric acid ester sprays in 1956.)**
*Schweiz. Z. Obst- u. Weinb.*, 1957, **66**: 25-33.

Combination sprays of oil and phosphoric acid esters were applied to apple orchards for the control of several insect pests. The most effective time of application was at bud-break, although oil-parathion sprays could be effectively applied earlier and later than this. A phosphoric acid ester compound applied alone as a pre-blossom spray was effective against leaf aphids, but against winter moth further tests are needed.

1366. Hammer, O. H.
**DOW-ET-14, a new organic phosphorus insecticide.**
*Down to Earth*, 1956, **12**(1): 2-5, illus.

O,O-dimethyl 0-2,4,5-trichlorophenyl phosphorothioate has been shown to exhibit low mammalian toxicity. It has given promising results against many pests of horticultural crops and most plants were found to be tolerant to single or fortnightly treatments.

### *Sprays and spray injury.*

(*See also* 1371k, 1784, 1996.)

1367. Peyer, E., and Zwicky, P.
Bietet das Sprühgerät Vorteile für die Rebenbespritzung? **(Has the misting apparatus advantages in spraying vines?)**
*Schweiz. Obst- u. Weinb.*, 1957, **66**: 94-9, illus.

Misting was as effective as spraying against vine diseases, provided equal amounts of fungicide were applied. The area treated per unit of time was approximately the same for both. Portable motor misting apparatus was more suitable for small than for large vineyards.

1368. van den Muijzenberg, E. W. B.
Comparaison entre le speedsprayer et l'auto-atomiseur. **(Comparison between the speed-sprayer and the auto-atomiser.)**
*Arboric. fruit.*, 1956, No. 33, pp. 7-8.

The auto-atomiser, operated by one man, is more economical than either the hand-atomizer, the speed-sprayer or the motor sprayer.—Inst. hort. Tech., Wageningen.

1369. Miller, L. W.
**Spray injury on apples in Tasmania.**
*Tasm. J. Agric.*, 1956, **27**: 347-54, illus.

The causes of spray injury are discussed under the following headings: 1. Nature of the pesticide used, with respect to (a) its chemical composition, (b) type of formulation and (c) incompatibility in mixtures. 2. Weather and seasonal conditions. 3. Health, stage of growth and variety of tree. 4. Mode of application. 5. Incorrect usage. Precautions that growers should take are listed.

1370. Miller, E. J.
**A note on mercury spray residues in apples.**
*Plant Path.*, 1956, **5**: 119-21, bibl. 3.

When 6–8 applications of organo-mercurial fungicides had been made, with the last application 10–13 weeks before picking, residues of the order of 0·04–0·07 p.p.m. mercury in the whole fruit were found in samples analysed in late January or early February.—Plant Path. Lab., Harpenden, Herts.

### *Noted.*

1371.

a Best, R. J.
**Resistance of higher plants to viruses.**
*J. Aust. Inst. agric. Sci.*, 1956, **22**: 174-9, bibl. 31, illus.
A review.

b Biological Branch, N.S.W. Department of Agriculture.
**Lichens.**
*Agric. Gaz. N.S.W.*, 1956, **67**: 489, illus.
Control with copper and oil sprays.

c BLISS, C. I., GREENWOOD, M. L., AND WHITE, E. S.
**A rankit analysis of paired comparisons for measuring the effect of sprays on flavor.**
*Biometrics*, 1956, **12**: 381-403, bibl. 15.
As applied to apples sprayed in a 2×2 factorial trial with 2 insecticides and 2 fungicides.

d BOLTON, A. T., FITZPATRICK, R. E., AND MELLOR, F. C.
**Common strawberry diseases and their control.**
*Publ. Canada Dep. Agric.* **982**, 1956, pp. 9, illus.
Fungus and virus.

e BRANNON, D. H., AND OTHERS.
**Recommendations for cranberry production in Washington.**
*Ext. Circ. Wash. St. agric. Ext. Serv.* **144**, revised 1956, 1 folded sheet.
Consists of an insect, disease and weed control programme.

f BRÜCKBAUER, H.
Betrachtungen über den Kältetod der Reben. **(Observations on the frost killing of vines.)**
*Wein-Wiss.*, 1956, No. 10, pp. 52-64, from abstr. in *Z. Pflkrankh.*, 1956, **63**: 647.
A review of the literature on the resistance of vines to spring and winter frost.

g DUNEGAN, J. C.
**Apple bitter rot.**
*Leafl. U.S. Dep. Agric.* **406**, 1956, 1 folded sheet, illus.
Symptoms and control of *Glomerella cingulata.*

h DYE, M. H.
**Horticultural formulations of streptomycin.**
*Orchard. N.Z.*, 1956, **29**(11): 2-3.
Practical considerations on their application for control of blast of stone fruit.

i GJAERUM, H. B.
Skurv på epler og paerer. **(Apple and pear scab.)**
*Småskr. LandbrDep. Opplysningstj.* **5/56**, [1956], pp. 8, illus.
Published for the Norwegian Plant Protection Service.

j GOOD, J. M., AND CHRISTIE, J. R.
**Water pressure injector for nematocides.**
*Plant Dis. Reptr*, 1956, **40**: 987-8, illus.

k GOOSSEN, H.
Zur Durchführung der Einsatzprüfung von Feldspritz- und Sprühgeräten. **(Methods of testing spraying and mist blowing equipment in the field.)**
*NachrBl. dtsch. PflSchDienst., Braunschweig*, 1956, **8**: 180-3, bibl. 7, illus.
(1) the stirring mechanism and (2) the distribution of the active substance (Cu) on the foliage of the crop.

l HANSEN, R. M.
**New dispenser aids gopher control.**
*Pamph. Colo. agric. Exp. Stat.* **1-S**, 1956, pp. 8, bibl. 2, illus.
For placement of poison in underground runs.

m HATCH, A. B.
**Antibiotics in plant disease control.**
*Amer. Nurserym.*, 1957, **105**(2): 10, 71-7.
A review.

n JORDOVIĆ, M.
Pljosnatost grana—nova virozna bolest jabuke u našoj zemlji. **(Flat limb, a new virus disease of apple trees in Yugoslavia.)** [English summary 3 lines.]
*Bilj. Proizv.*, 1956, **9**: 211-13, bibl. 3, illus.
Observed on the variety Gravenstein at Čačak.

o MALLACH, N.
Viruskrankheiten und virusähnliche Erkrankungen des Kern- und Steinobstes. **(Virus diseases and suspected virus diseases of pome and stone fruit.)**
[*Publ.*] *Obst- u. Gartenbauverlag*, 1956, pp. 36, illus., from abstr. in *Z. PflKrankh.*, 1956, **63**: 654.

p OSSERVATORIO FITOPATOLOGICO, BOLOGNA.
Precauzioni da prendere nell'uso di prodotti a base di esteri fosforici. **(Precautions to be taken in using products containing phosphoric esters.)**
*Inf. fitopat.*, 1956, **6**: 238.

q PLANT PATHOLOGY DIVISION, TASMANIAN DEPARTMENT OF AGRICULTURE.
**Sooty blotch of apples.**
*Tasm. J. Agric.*, 1956, **27**: 342, illus.
Thiram or captan recommended against *Gloeodes pomigena* in wet summers.

r PRIDHAM, T. G., AND OTHERS.
**Antibiotics against plant disease. I. Laboratory and greenhouse survey.**
*Phytopathology*, 1956, **46**: 568-75, bibl. 9.
About 500 strains of *Streptomyces* tested against various bacterial and fungus diseases.

s SIBILIA, C.
Il servizio fitopatologico nella Repubblica popolare cinese. **(The plant protection service of the Chinese People's Republic.)**
*Ital. agric.*, 1956, **93**: 937-44, illus.

t TAYLOR, C. F.
**A device for recording the duration of dew deposits.**
*Plant Dis. Reptr*, 1956, **40**: 1025-8, bibl. 8, illus.
For use in the study of the epiphytology of plant diseases, especially apple scab.

u TOPALOVIĆ, G.
Neka iskustva u predvidanju pojave plamenjače vinove loze. **(Experience in forecasting the appearance of downy mildew on vine.)** [French summary 2¼ pp.]
*Zasht. Bilja*, 1956, No. 34, pp. 3-19.

v TRESHOW, M.
**The effects of fluorine on the anatomy of Chinese apricot leaves.**
From abstr. in *Phytopathology*, 1956, **46**: 640.
Leaves of Chinese apricot and Italian prune.

w VAN DE VRIE, M.
Nieuwe wegen in de bestrijding van het fruitspint. **(New methods of control of the fruit tree red spider.)** [English summary ¾ p.]
Reprinted from *Meded. LandbHoogesch. Gent*, 1955, **20**: 301-8.
A brief review of the effects of recent acaricidal introductions.

x WILLIAMS, H. E., AND CAMERON, H. R.
**Silver-leaf of Montmorency sour cherry in Oregon.**
*Plant Dis. Reptr*, 1956, **40**: 954-6, bibl. 13, illus.
Reported for the first time.

y WOOD, G. W.
**Note on injury to blueberry sprouts by the blueberry thrips, *Frankliniella vaccinii* Morgan (*Thysanoptera : Thripidae*).**
*Canad. J. agric. Sci.*, 1956, **36**: 510, bibl. 2.
The potential yield of infested plants was reduced by 97%.

z ZEYLSTRA, H. H.
Papierchromatografie als middel voor de diagnose van de ringvlekkenziekte van zoete kers. Een voorlopige mededeling. **(Paper chromatography as a means of diagnosing ring spot disease of sweet cherry. A preliminary report.)** [English summary ¼ p.]
*Tijdschr. PlZiekt.*, 1956, **62**: 325-6, bibl. 3.

## WEEDS AND WEED CONTROL.

### *General.*

(*See also* 1352, 1371b, 1413a-c, e, g-j.)

1372. LOOMIS, W. E., AND OTHERS.
**Basic studies.**
*Res. Rep. 12th annu. N. centr. Weed Control Conf.*, 1955, pp. 179-86.

*Absorption and translocation of 2,4-D and $P^{32}$*: The addition of a wetting agent to $P^{32}$ increased absorption by a maximum of 20% whereas absorption of 2,4-D was increased by 1,000% or more. The temperature coefficient for absorption of $P^{32}$ is 1·0, that for 2,4-D 2·0–3·0. The temperature coefficient for translocation out of treated leaves averaged 2·0 for both materials, and was dependent upon a supply of sugar in the exporting leaf. *Effect of 2,4-D on the uptake and distribution of potassium by bean plants:* Counts of radio-activity from the application of $K^{42}$ to plants with and without previous 2,4-D sprays showed that after 8 hours the 2,4-D treated plants had taken up 4–5 times as much K as the controls, but after 24 hours the treated plants contained half as much K as the controls. —From *Weed Abstr.*, **5**, No. 1800.

1373. MINSHALL, W. H., AND BIRK, L. A.
**Basic studies.**
*Res. Rep. east. Sect. nat. Weed Cttee*, Quebec, 1956, pp. 42-3.

*Penetration of and persistence in soil of CMU:* From CMU applied at 1·6–64 lb./ac. residual concentrations at 0–1 in., 2–4 in. and 4–8 in. depths were determined by chemical analysis and cereals were used as indicator crops. *Effects of CMU on dry matter production and transpiration in excised primary leaves of bean:* Excised primary leaves from 2½-week-old kidney bean plants had the cut ends of their petioles placed in water solution of CMU for varying lengths of time to give a range of internal concentrations. Following the absorption of CMU the leaves were transferred to water and held for 3 days at 80° F. with a 16 hour day of 1,150 ft. candles of fluorescent light. When compared with water controls, average internal concentration of CMU of 17, 30, 48 and 95 μg./g. fresh weight of leaf inhibited the increase in dry weight 89, 100, 100 and 100% respectively, and inhibited the average rate of transpiration 38, 57, 67 and 70% respectively. The author states that the complete inhibition of dry matter production by such low concentration suggests that CMU may act as a photosynthetic poison.—From *Weed Abstr.*, **5**, No. 1767. [See also *H.A.*, 26: 1671.]

1374. DI CARO, S.
Gli erbicidi. **(Herbicides.)**
*Inf. fitopat.*, 1956, **6**: 166-71, 230-4, illus.
A review on chemical weed control in field crops and orchards, with a note on damage to tomato and vine foliage by 2,4-D.

1375. HELLQVIST, H.
**The effect of volume application rate on the retention and activity of herbicides.**
*Ann. roy. agric. Coll. Sweden*, 1956, **22**: 41-92, bibl. 49, illus.
The results reported in an earlier phase of the project [*H.A.*, 23: 2997] were confirmed, viz. that peas are more susceptible to higher concentrations of MCPA than to applications of the same amount of active substance applied at the standard dilution. Factors governing the retention of herbicides by plants and methods of measuring retention are discussed in detail.

1376. GARD, L. N., AND REYNOLDS, J. L.
**Residues in crops treated with isopropyl N-(3-chlorophenyl) carbamate and isopropyl N-phenylcarbamate.**
*J. agric. Food Chem.*, 1957, **5**: 39-41, bibl. 4.
An analytical method for the measurement of isopropyl N-(3-chlorophenyl) carbamate in experimental field plots was applied to grapes, tomatoes, carrots, sweet

potatoes, strawberries and peaches; peas were tested for isopropyl N-phenylcarbamate residue. The average recovery of added values of the herbicides to untreated crops was about 89% by this method. Results showed that the harvested crops which had been treated with isopropyl N-(3-chlorophenyl) carbamate did not contain herbicidal residues in excess of 0·05 p.p.m. [From authors' abstract.]—Columbia-Southern chem. Corp., Barberton, Ohio.

1377. ADAMSON, R. M.
**Weed control experiments on Vancouver Island.**
*Publ. Domin. exp. Fm, Saanichton, B.C.* **164**, 1956, pp. 43 + iii, illus.

This is a comprehensive review of weed control work at Saanichton, mainly in fruit, flowers, vegetables and lawns, and also of methods used for controlling certain perennial weeds, woody growth and roadside vegetation. In an appendix brief notes are given on 26 herbicides referred to in the text.

1378. ADAMSON, R. M.
**Control of field bindweed with methyl bromide (Dowfume MC-2).**
*Down to Earth*, 1956, **12**(3): 12, illus.

In trials at the Experimental Farm, Saanichton, B.C., excellent control of field bindweed, *Convolvulus arvensis*, was obtained by fumigation with Dowfume MC-2 at 1 lb./100 sq. ft. when the pliofilm sheets covering the area were left in position for 24 or 48 hours. MC-2 used at 0·25 and 0·5 lb./100 sq. ft. did not give complete control, and laminated asphalt paper did not prove a satisfactory substitute for pliofilm. It is concluded that the temporary sterilization effected by the MC-2 treatment makes it especially useful for small, intensively cropped areas, such as nurseries and frames, where early replanting is of importance.

### *Weed control in fruit crops.*

(*See also* 1371e.)

1379. HEMPHILL, D. D., AND OTHERS.
**[Weed control in] fruits.**
*Res. Rep. 12th annu. N. centr. Weed Control Conf.*, 1955, pp. 151-5.

*Apples:* In an experiment to control vegetation around newly transplanted apple trees 1-chloropropyl-2-N-(3-chlorophenyl) carbamate [CPCPC] at 14 lb./ac. and dinoseb fortified oil spray were the most satisfactory herbicides tested. CPCPC appeared superior to CIPC for the control of ragweed [*Ambrosia* spp.]. CMU at 2 lb./ac. caused chlorosis and stunting and killed 50% of the apple trees. [See also *H.A.*, 26: 3618.] *Cranberries:* An experiment to assess the tolerance of cranberries to various herbicides showed that at the time the fruit buds began to swell 2,4-DES 4–8 lb./ac., MH 4–12 lb./ac., NPA 5–15 lb./ac., 2,4-D (amine) 0·25 and 0·5 lb./ac. and potassium cyanate 5–10 lb./ac. could be used without serious injury. Late spring application of 2,4-DES, MH and potassium cyanate just before flowering was also promising. Dalapon 6–18 lb./ac. gave 95% control of *Carex rostrata* but the cranberry crop the following year was lost. *Grapes:* CIPC 14 lb./ac. and CMU 2 lb./ac. continued to be successful for weed control in mature vineyards. CMU caused chlorosis of the leaves of young plants. *Raspberries:* 2,4-DES 4 lb./ac., 2,4-DEB 4 and 6 lb./ac. and 2,4,5-TES gave effective control of annual weeds in Latham raspberries without loss of yield the following season. 2,4,5-TES and 2,4-DEB showed longer residual properties than 2,4-DES. *Strawberries:* 2,4-DES, 2,4-DEB, 2,4,5-TES, MCPES and 3,4-DDU caused no apparent injury at 3–4 lb./ac. and did not significantly reduce the number of runners per plot. CIPC 6 lb./ac. stunted the strawberries and reduced the number of runners by 60%. A single application of 2,4-D 1 and 2 lb./ac. reduced runners by 30% while 2,3,6-TBA 1 and 2 lb./ac. caused severe stunting and distortion and reduced runner plants by 73–96% respectively.—From *Weed Abstr.*, **5**, No. 1792.

1380. WHITE, R. G., AND OTHERS.
**[Weed control in] fruits and blueberries.**
*Res. Rep. east. Sect. nat. Weed Cttee*, Quebec, 1956, pp. 32-3.

*Strawberries:* Neburon at 2 and 4 lb./ac. in 100 gal. applied after picking Premier strawberries killed 95% of *Stellaria media* and *Capsella bursa-pastoris*. *Chenopodium album*, *Amaranthus retroflexus* and dandelion were injured but recovered, and *Echinochloa crus-galli* was unaffected. The strawberry plants showed only slight temporary chlorosis. *Apples:* Dalapon (78% sodium salt) diluted at 1·25 lb. in 100 gal. and applied in a 3 ft. band round the trunks at 2 gal./tree eliminated perennial grasses (*Poa pratensis*, *Agropyron repens* and *Festuca* spp.). Sucker growth observed after 3 annual treatments indicated that there was no residual toxicity to the apple trees. Perennial grasses in the sod-mulch beneath the trees were also eliminated by annual applications of dalapon at 10 lb./ac. (1·5 oz./tree in 2 gal.) while broad leaved weeds, lucerne, clover and annual grasses were not discouraged. Amino triazole used in one season showed promise as a grass suppressant and was also effective against *Rhus radicans* and *R. typhina*. Application of dalapon in late spring at the trunk area for grass control and of amino triazole a month later over the entire mulch for poison ivy control gave good results without visible toxicity effects.—From *Weed Abstr.*, **5**, No. 1761.

1381. CHAPPELL, W. E.
**Control of poison ivy and grass in apple orchards.**
*Down to Earth*, 1956, **12**(1): 6-7, illus.

Both the amine and ester forms of 2,4,5-T at 2,000 p.p.m. effectively controlled poison ivy under apple trees without causing any apparent injury to tree or fruit. In preliminary trials perennial grasses were safely controlled under apple trees with dalapon at 1 lb. in 5 gal. applied in April. When Esterton Brush Killer or amino triazole was added to the spray mixture poison ivy was also controlled.—Va agric. Exp. Stat., Blacksburg.

1382. ANON.
**New undervine weeder a boon for vineyards.**
*Fruit World, Melbourne*, 1956, **57**(8): 17, illus.

A rotary weeding attachment for the tractor has a projection which guides the cutting head round the vine stems. The implement has been used successfully on many growers' farms, and with it more than 6 acres can be weeded in a day.

1383. Day, B. E., and McCarty, C. D.
**Weed control in avocado orchards.**
*Yearb. Calif. Avoc. Soc. for 1956*, pp. 81-5.
For general weed control in avocado orchards only mineral oils appear to be safe. Some of the basic principles of oil toxicity and the characteristics of oils that effect their efficiency as weed killers are considered in this paper, but neither are experimental results given nor firm recommendations made. Of the systemic herbicides, the amine salt or emulsifiable acid formulations of 2,4-D can be used for spot treatment near avocado trees, and amino triazole is being tested. It appears probable that CMU [monuron] or one of the other urea compounds will prove to be usable in avocado orchards, as in citrus, but with a lower margin of safety for errors in application.

### *Weed control in ornamentals.*

1384. Mahlstede, J. P., and others.
**[Weed control in] ornamental nurseries, forest nurseries, shelter belts, and all others.**
*Res. Rep. 12th annu. N. centr. Weed Control Conf.*, 1955, pp. 156-9.
Several experiments on the control of weeds in nurseries of established and transplanted *Taxus* are described. Mid-summer application of 2,4,5-TES at 2–6 lb./ac. as a pre-weed emergence treatment gave satisfactory control of broad-leaved weeds without injury to one-year-old *Taxus* cuttings and reduced the time required for hand weeding by 50%. Mixtures of CMU 0·5 lb./ac. and 2,4-DES applied as pre-emergence herbicides to established *Taxus cuspidata intermedia* showed promise. No injury to Douglas fir, Austrian pine or Black Hills spruce occurred after treatment with 2,4-DES ± CMU or NPA following two years' treatment. Slight stunting and burning of red cedar was observed following 3 treatments with 2,4-DES + NPA in 2 seasons.—From *Weed Abstr.*, **5**, No. 1793.

1385. Picard, —.
Le desherbage de pepinières. **(Weed control in nurseries.)**
*Journées franç. Inf. Fed. nat. Prot. Cult.*, November 1956, pp. 4.
Of 5 herbicides applied pre-emergence in nurseries of *Pinus nigra* and *Picea excelsa* DNC at 5 kg./ha. was the most promising. The effect of post-emergence application of mineral oils was noted on 5 conifers.—*Weed Abstr.*, **6**, No. 75.

1386. Carlson, R. F.
**Weed control research in ground cover plants.**
*Amer. Nurserym.*, 1956, **104**(9): 12, illus.
Crag Herbicide-1 and Alanap-1 were applied to potted ground cover plants of 11 species. All except *Ajuga reptans* were tolerant to Crag Herbicide-1 at 2 and 4 lb. per acre. Four species were tolerant to Alanap-1 at 3 and 6 lb. per acre, namely *Euonymus fortunei vegetus*, *E. f. radicans*, *Lonicera japonica halliana* and *Vinca minor alba*. The remaining species (*Ajuga reptans*, *Euonymus fortunei carrierei*, *Hedera helix* and 3 of its varieties, and *Pachysandra terminalis*) were injured by Alanap-1.

1387. Anon.
**Chemical control for weeds in gladiolus.**
*R.I. Agriculture*, 1955, **1**(4): 7.
CMU at 0·5 lb./ac. applied before buds appear is recommended for the control of weeds in gladiolus beds. The herbicide had no apparent effect on the length of the flower stems or the time of blooming. Weeds controlled included purslane [*Portulaca oleracea*], chickweed [*Stellaria media*], lambsquarters [*Chenopodium album*], ragweed [*Ambrosia* sp.], galinsoga [*Galinsoga ciliata*], clover [*Trifolium* sp.], mustard and several species of grasses. CIPC also gave good weed control in gladiolus but seemed to injure the plants slightly.—*Weed Abstr.*, **5**, No. 1594.

### *Weed control in tropical crops.*

(*See also* 1413d.)

1388. Lefort, E. J. E.
**Practical aspects of weed-killing by chemicals in tropical crops.**
[*Publ.*] *S. Pacific Commiss.*, 1955, pp. 19 + appendices and tables, bibl. 27.
A brief general consideration of chemical weed control in the tropics is followed by a more detailed account of the properties and uses of herbicides. The characteristics of the principal weed killers, weed susceptibility ro 2,4-D, and availability of commercial materials in Australia and New Zealand are among the practical information here presented in tabular form.

1389. van der Linde van Sprankhuizen, J. C.
Chemische onkruidbestrijding in Indonesie. **(Chemical weed control in Indonesia.)**
[English and Indonesian summaries ½ p. each.]
*Bergcultures*, 1956, **25**: 463-80, bibl. 7.
Herbicide efficiency is reviewed and cases where chemical control has been used, particularly in plantation crops, are discussed. It is emphasized that weed control by chemicals should be regarded as secondary to mechanical weed control.

1390. Rubber Research Institute of Malaya.
**Dowpon—lalang and grass eradicant.**
*Plant. Bull. R.R.I.M.*, 1957, No. 29, pp. 27-30, illus.
When lalang (*Imperata cylindrica*) was slashed and then allowed to grow again to a height of 12–18 in., it required about 80 lb. Dowpon (dalapon) per acre to kill it completely, whereas unslashed lalang was killed by 10 lb. Dowpon per acre. There was little extra effect from spraying with sodium chlorate or sodium arsenite 3 months before the application of Dowpon. Dowpon at 10 lb. per acre also destroyed bamboo grass (*Ischaemum muticum*) as effectively as sodium chlorate but was more expensive. It may be necessary to use 2,4-D to control broad-leaved weeds colonising areas where lalang has been eradicated. Dowpon may cause damage to rubber trees, so it is recommended that the normal dose of 10 lb. per acre (or a maximum of 15 lb. per acre) in 100 gal. water should not be exceeded. Among the more sensitive clones is LCB 1320, and among the less sensitive, PR 107 and RRIM 501.
J.R.L.

1391. Barbier, M., and Trupin, F.
**Utilisation des monuron et diuron comme herbicides dans les plantations d'ananas. (Martinique et Cameroun.) (The use of monuron and diuron as herbicides in pineapple plantations in Martinique and the Cameroons.)**
*Fruits d'Outre Mer*, 1956, **11**: 443-6, bibl. 1.
In Martinique monuron and diuron successfully controlled weeds in pineapples, especially in young plantations. Satisfactory results were obtained at rates of 4 to 5 kg./ha. Diuron may safely be used during the rainy season, but monuron should only be applied in the dry season. In a preliminary trial in the Cameroons monuron at 10 kg./ha controlled all weeds except nutgrass.—I.F.A.C.

1392. Guzman, V. L.
**Herbicidal control of weeds in sugar cane growing in muck soil.**
*Proc. Soil Sci. Soc. Fla, 1955*, **15**: 53-9, bibl. 2, illus.
The results of 3 experiments are reported. In the second year of a perennial experiment it was shown that the yield of cane and sugar was greater on plots where the weeds were controlled chemically than where cultivation was used. Control of grass weeds was better with 20 lb./acre of TCA applied 3 times or with 5 lb. Karmex W applied twice followed by 20 lb. TCA than when 2 or 3 lb. Karmex W were used in the earlier sprays. In a second experiment control of weeds was excellent with the early use of herbicides but later applications were ineffective. Yields of cane and 96° sugar appeared to be in relation to the earliness and effectiveness of the weed control. In the third experiment 1·0, 1·5 or 2·0 lb. of the amine salt of 2,4-D were applied in 10, 20, 30, 40 or 60 gal. water/acre. The results indicated that 1·5 lb. of 2,4-D was as effective as 2·0 lb./acre and that 20–30 gal./acre were adequate. [For an earlier report see *H.A.*, 26: 1660.]—Everglades Exp. Stat., Belle Glade. J.R.L.

### *Weed control in turf.*

1393. Arnold, E. H.
**Treatment of moss in greens.**
*N.Z. J. Agric.*, 1956, **93**: 183, illus.
Applications of a 3 : 1 mixture of sulphate of ammonia and superphosphate will encourage grasses and kill mosses. Spraying with dichlone, thiram or sodium pentachlorophenate is recommended. The last has proved very effective in trials at Auckland. J.R.L.

1394. Lee, O. C., and others.
**[Weed control in] turf.**
*Res. Rep. 12th annu. N. centr. Weed Control Conf.*, 1955, pp. 129-33.
Most of the work submitted describes work on *Digitaria sanguinalis*, but no satisfactory method of control in turf was reported, even the most promising herbicides needing repeated treatments. Pre-emergence applications of NPA, neburon and 2,4-DES gave some measure of control. Chlordane at 80–100 lb./ac. as a granular material or spray gave reasonably good control on a golf-course. Methyl bromide at 1 lb./100 sq. ft., dalapon at 10 lb./ac., dalapon at 5 lb. + amino triazole at 5 lb./ac. and Vapam (sodium N-methyl dithiocarbamate dihydrate) at 1 quart/100 sq. ft. gave over 75% control of *Cynodon dactylon* in a lawn. Spring treatments of a bluegrass lawn infested with *Stellaria media* with ammonium sulphate at 2 lb./100 sq. ft. were 93% successful and, although some burning of the bluegrass was apparent, later growth was better than on the control plots. A sticker added to 2,4-D, 2,4,5-T, MCPA at 3 lb./ac. and 2,3,6-TBA at 4 lb./ac. increased their efficiency in controlling *Lamium amplexicaule*. The application of methyl bromide to an undisturbed weedy lawn, followed by fertilization and seeding, produced an excellent stand of pure Merion bluegrass with few weeds.—From *Weed Abstr.*, **5**, No. 1788.

1395. Neilson, J. J., and Olsen, O. A.
**[Weed control in] lawns.**
*Res. Rep. east. Sect. nat. Weed Cttee*, Quebec, 1956, p. 18.
*Control of chickweed and crabgrass in lawns:* Lawns consisting of a mixture of Kentucky bluegrass, red fescue, Chewing's fescue and white Dutch clover were infested with 2 species of chickweed, *Cerastium vulgatum* and *Stellaria media*. CIPC and propham (granular) each applied at 6 lb./ac. and neburon at 4 lb./ac. killed *S. media*, but only neburon eliminated *C. vulgatum*. The 3 chemicals, especially neburon, injured the turf grasses particularly fescue. *Trial of neburon on lawns:* Lawns sprayed with neburon at 2 lb./ac. in 100 gal. and 3 weeks later were retreated at 6 lb./ac. Some of the 5 weed species present were controlled, but bent grass in lawn mixture was killed by the treatment.—From *Weed Abstr.*, **5**, No. 1759.

1396. Anon.
**Maleic hydrazide of limited use on turf.**
*R.I. Agriculture*, 1955, **1**(4): 7, 9, illus.
MH at 2 oz. per 1,000 sq. ft. in 10 gal. caused temporary injury, and at 4 and 6 oz. permanent injury, to an 11-year-old turf.—From *Weed Abstr.*, **5**, No. 1595.

### *Weed control in vegetables and tobacco.*

(*See also* 1372-6.)

1397. Jasmin, J. J., and others.
**[Weed control in] horticultural crops. (a) Vegetables and flowers.**
*Res. Rep. east. Sect. nat. Weed Cttee*, Quebec, 1956, pp. 19-31.
A summary is given of 17 abstracts on weed control in asparagus, beet, carrot, lettuce, spinach, mint, celery, onion, pea and annual and perennial flowers. Over 20 herbicides, including such new materials as neburon, CDAA and CDEA, were evaluated with respect to both weed control and crop tolerance.—From *Weed Abstr.*, **5**, No. 1760.

1398. Warren, G. F., and others.
**[Weed control in] other vegetables.**
*Res. Rep. 12th annu. N. centr. Weed Control Conf.*, 1955, pp. 146-50.
*Beans:* Pre-emergence treatments were made to snap and lima beans. Dinoseb at 6 lb./ac. gave consistently good results and in one case a mixture with CMU was considered particularly helpful. One experiment in-

dicated that CDEC, CDAA and CDEA all at 8 lb./ac. may be useful. *Tomato:* Transplants were severely injured by 2,4,5-TES. *Peppers:* Application of 2,4,5-TES at 2 lb./ac. appears to be safe immediately after transplanting and of 3–4 lb./ac. 4 weeks after transplanting. *Broccoli and cabbage:* Transplants were successfully treated with 8 lb./ac. of TCA as a basal directed spray 1 week after planting for the control of grass weeds. 2,4,5-TES at 2 lb./ac. applied 1 week after transplanting showed promise, higher rates caused injury. *Cucurbits:* Satisfactory weed control and no yield reductions were obtained from the pre-emergence applications of dinoseb and NPA each at 4 lb./ac. and DCU at 10 lb./ac. on cantaloupe, cucumber and watermelon. CDEC at 6 lb./ac. caused stunting and yield reduction in cantaloupe but did not appear to harm cucumber and watermelon. *Safflower:* Effective treatments caused crop injury and non-injurious ones gave poor weed control. *Asparagus:* CMU at 3 lb./ac., 2,4-DES at 4 lb./ac., NPA (sodium) at 4 lb./ac. and a mixture of 2,4-D (amine) at 2 lb./ac. and TCA at 6 lb./ac. were used successfully in a commercial planting. *Peppermint:* While individual applications of dinoseb or CIPC did not give consistent results, their mixtures gave consistently good weed control and did not reduce the yield of peppermint oil.—From *Weed Abstr.*, **5**, No. 1791.

1399. Robin, F.
Le desherbage selectif des asperges. **(Selective weeding of asparagus.)**
*Journées franç. Inf. Fed. nat. Prot. Cult.*, November 1956, pp. 2.

Monuron and simazin are recommended for weed control in asparagus, the latter at 1–1·5 kg. in 1,000 l. of water/ha. Application should be made after earthing up in the spring.—*Weed Abstr.*, **6**, No. 72.

1400. Bruns, V. F., and Clore, W. J.
**Tolerance of asparagus to 2,4-D.**
*Weeds, N. York*, 1956, **4**: 393-6, bibl. 6.

An alkanolamine salt of 2,4-D at 2 lb./ac. was applied to an established asparagus bed during the first week in June each year for 5 consecutive years. Prior to 2,4-D application all the emerged spears were cut below the ground level in one series of plots, and in another only the marketable spears were cut below ground level. The 2,4-D treatments caused no significant reduction in yield as measured in terms of number of spears, weight of 100 spears or tons per acre. Fern and crowns appeared normal and uninjured from all treatments after 5 years.—*Weed Abstr.*, **5**, No. 1596.

1401. Benavides Gómez, M.
Control práctico de las malezas en los cultivos del fríjol en el Valle del Cauca. **(Practical weed control in bean crops in the Valle del Cauca.)**
*Agric. trop. Bogotá*, 1956, **12**: 221-7, illus.

The triethanolamine-isopropanolamine salt of DNBP (dinitro-ortho-secondary butyl phenol), applied as a pre-emergence spray in 30 cm. bands along the rows immediately after sowing bean seeds, gives excellent control of shallow-rooted weeds until the beans give sufficient shade to suppress those germinating later. Inter-row weeds can be controlled mechanically.

1402. Hay, J. R., and Thimann, K. V.
**The fate of 2,4-dichlorophenoxyacetic acid in bean seedlings. 1. Recovery of 2,4-dichlorophenoxyacetic acid and its breakdown in the plant.**
*Plant Physiol.*, 1956, **31**: 382-7, bibl. 29, illus.

A method for the extraction and bioassay of 2,4-D from treated plants is described. It is shown that recovery from bean seedlings is quantitative but that freely extractable 2,4-D rapidly disappears in the plant. This loss, presumably breakdown, is considerably faster in light than in darkness but even in the dark three-quarters of the absorbed 2,4-D disappears in 5 days. The advantages of the method over those based on indirect criteria are discussed. [Authors' summary.] —Harvard Univ., Cambridge 38, Mass.

1403. Anon.
Combate de malezas con herbicidas en siembras de caraotas y frijoles. **(Weed control with herbicides in haricots and french beans.)**
*Not. agric. Serv. Shell Agric., Venezuela*, 1956, **1**(13): 1–3, illus.

Recommendations, based on Venezuelan field experiments, are made for application of CMU, PCP and DNP to newly sown beans. *Euphorbia graminis* was resistant to CMU applied at seeding at 800–1,000 g. per ha. Pre-emergence applications of 90 l. of PCP or 20 l. of DNP per ha. and post-emergence application of DNP at 3 l. per ha. were successful and economic.

1404. Sexsmith, J. J., and others.
**[Weed control in] field and canning peas.**
*Res. Rep. 12th annu. N. centr. Weed Control Conf.*, 1955, pp. 134-6.

More injury was caused by 2,4-D than by MCPA, while increasing the spray volume decreased crop injury from both compounds. Pre-seeding treatments with propham or CIPC 6 and 8 lb./ac., isopropyl methylphenyl carbamate 8 lb./ac., CDAA 3 and 6 lb./ac. or CDEA 6 lb./ac. gave excellent control of *Avena fatua* without causing excessive injury to peas. Pre-emergence treatments which did not injure peas and gave satisfactory control of broad-leaved weeds include dinoseb 6 and 9 lb./ac., a-chloro-diethylamino triazine 8 lb./ac., CIPC 8 lb./ac., CDAA and CDEA 6 lb./ac. gave reasonably good control of *A. fatua* and dinoseb 9 lb./ac., 2,4-dichlorophenoxyethylphosphite 6 lb./ac., CDEA 6 and 9 lb./ac., CDEC 9 lb./ac. and CIPC 8 lb./ac. gave fairly good control of *Setaria* spp. Post-emergence treatments with MCPA 0·3 lb./ac., dinoseb 1 and 1·5 lb./ac., a mixture of these, or dalapon 1 lb. + dinoseb 1 lb. gave excellent control of broad-leaved annual weeds, while the mixtures gave excellent control of *Setaria* spp. without causing serious injury to peas.—*Weed Abstr.*, **5**, No. 1789.

1405. Desmayard, P., and Dodel, J. B.
Le MCPB. (MCPB.)
*Journées franç. Inf. Fed. nat. Prot. Cult.*, November 1956, pp. 7.

A short description of French field experiments with

MCPB. Of 60 varieties of peas tested, only Kelvedon Wonder and Petit Provençal suffered any lasting injury. It is recommended that peas should be sprayed when 10–20 cm. tall.—From *Weed Abstr.*, **6**, No. 74.

1406. CHAFFARD, M.
Le desherbage selectif des oignons et poireaux. (**Selective weed control in onions and leeks.**)
*Journées franç. Inf. Fed. nat. Prot. Cult.*, November 1956, pp. 20, bibl. 27.
A review. The author makes the following recommendations: pre-emergence—dinitrophenol (ammonium) 7–8 kg. in 1,000 l./ha., DNC (ammonium 3–3·5 kg. in 1,000 l./ha., PCP (sodium) 10–20 kg. in 1,000 l./ha., dinoseb (ammonium) 0·9–1·5 kg. in 1,000 l./ha.; emergence—potassium cyanate 10 kg. in 600–1,000 l./ha.; post-emergence to 20 cm. high—potassium cyanate 10–20 kg. in 600–1,000 l./ha., after the 2 true leaf stage potassium ethyl xanthate 10–20 kg. in 600–1,000 l./ha., crook stage (crochet releve) dinitro phenol 6–8 kg. in 600–1,000 l./ha.—*Weed Abstr.*, **6**, No. 69.

1407. REBOSIO, A.
Resultados obtenidos sobre algunos ensayos de herbicidas. (**Results of some herbicide trials.**) [English summary 2 lines.]
*Rev. Asoc. Ingen. agron. Montevideo*, 1956, **25**: 60-7, bibl. 1.
2,4-D amine at the rate of 1·4 l./ha., applied to onions 3 months after transplanting, satisfactorily controlled broad-leaved weeds without injury to the crop.

1408. ALBAN, E. K., AND OTHERS.
[**Application of herbicides in**] **vegetable "root crops".**
*Res. Rep. 12th annu. N. centr. Weed Control Conf.*, 1955, pp. 137-45.
*Turnips:* Investigations on the effect of 2,4-D (ethanolamine] sprays at 1–100 p.p.m. on turnips with 4–5 leaves revealed that concentrations as low as 5 p.p.m. caused distortion of the upper part. Treatment with 50–500 p.p.m. 2,4-D when the turnips were 2–4 in. diameter produced epinasty and reddish coloration of the leaves. Effects 5 weeks after treatment at both stages of growth were noted. Weight and size were reduced by all concentrations. *Onions:* CIPC was applied to onions at various stages of growth by several investigators. At 8 lb./ac. a delayed pre-emergence treatment was usually successful in controlling weeds and reducing labour costs of first hand weeding without reducing yields. Post-emergence application of CIPC in general did not reduce onion yield at any stage of growth except when applied in oil formulation at 10·25 lb./ac. A seasonal total of 30 lb./ac. CIPC did not reduce yields. One worker screened a number of compounds on onions at various stages of growth, the most promising of which were: a-chlorodiethylamino triazine 4 and 8 lb./ac., CDAA 6 lb./ac., chloroethyl chlorophenyl carbamate 4 and 8 lb./ac., chloropropyl chlorophenyl carbamate 4 and 8 lb./ac., bis(ethyl xanthic] disulphide 10 lb./ac. and CMU 8 lb./ac.—From *Weed Abstr.*, **5**, No. 1790.

1409. MENGES, R. M., AND ALDRICH, R. J.
**Quality of tomato fruit as affected by sodium 2,4,5-trichlorophenoxy ethyl sulfate.**
*Weeds, N. York*, 1956, **4**: 386-92, bibl. 20.
A study was made on the effect of 2,4,5-TES at 2·5–3 and 5–6 lb./ac. on quality of tomatoes treated 8 weeks after transplanting. The percentage of cracked fruit was not increased by 3 lb./ac. but was significantly increased by 6 lb./ac. Blossom end rot was increased by both rates. Total nitrogen and total acids were unaffected by 2·5 lb./ac., but there was a tendency for nitrogen to be increased and total acids to be decreased by 5 lb./ac. Phosphorus content of the fruit was decreased and sodium increased by both rates. The herbicide had no appreciable effect on the taste of the juice, total carbohydrates, potassium or dry matter or on the interior veining or seedlessness of the fruit. —*Weed Abstr.*, **5**, No. 1597. [For a shorter account see *H.A.*, 26: 3678.]

1410. LEVONEN, H. J., AND MUKULA, J.
Petrolivalmisteista sarjakukkaisviljelysten rikkaruohontorjunnassa. (**Weed control with petrol products in umbelliferous crops.**) [English summary 6 lines.]
*Maatalous ja Koetoim.*, Part 10, 1956, pp. 97-103, bibl. 4, illus.
Shell weedkiller W completely controlled weeds among carrot, parsley, dill and celery without damaging the vegetables. Shell petrol was not so effective and damaged the crops. Dieseloil (Naphtha) killed all plants in the field. Aviation petrol had no effect. [From authors' summary.]—Dep. Plant Path., agric. Res. Centre, Tikkurila.

1411. FREEMAN, J. F.
**Fall *vs.* spring treatment of tobacco plant beds for control of weeds.**
*Spec. Progr. Rep. Ky Fm Home Sci.* **1**, 1955, p. 21, illus.
The following were compared on 5-year bluegrass sod as spring and autumn weed control treatments: burning, fumigation with methyl bromide, drenching with chlorobromopropene and water, drenching with allyl alcohol, drenching with soluble sodium cyanamide and water (autumn only), and applications of 1, 1·5 and 2 lb./sq. yd. calcium cyanamide (autumn only). Spring treatments were slightly superior but the difference was outweighed by the better treatment conditions in autumn. All treatments except calcium cyanamide at 1 lb./sq. yd. gave approximately 70–90% control.—*Weed Abstr.*, **5**, No. 1592.

1412. (PÉREZ, R.)
Procedimiento para exterminar la *Orobanche ramosa*. (**Procedure for exterminating *Orobanche ramosa*.**)
*Rev. Agric. Habana*, 1956, **39**(2): 78-84, illus.
Most herbicides which killed the parasite were very injurious to the tobacco crop. Ammonium sulphamate was completely ineffective. Careful straight-jet spraying of the soil with 2-propenol-1 at 10 c.c. per gal. of water killed the broomrape in 2 days without harming the crop. At half this concentration the action was equally effective, but slower. Fan-jet spraying of the recently emerged parasite with MH-30 at 50 c.c. per gal. of water gave equally good results.

*Noted.*

1413.

a CRESCINI, F., MARTINELLI, E., AND BELLINI, P.
Sulla biologia delle erbe infestanti. II. Foto e frigosensibilità degli acheni di *Artemisia vulgaris* L. **(Biology of weeds. II. Sensitivity of achenes of *Artemisia vulgaris* to light and cold.)** [English summary 1 p.]
*Ann. Sper. agrar.*, 1956, **10**: 2157-70, bibl. 3.
For Part I see *H.A.*, 24: 404a.

b DUNHAM, R. S. (EDITOR).
**Quackgrass control.**
*Stat. Bull. Minn. agric. Exp. Stat.* **434**, 1956, pp. 12, illus.

c DUTTON, W. C., AND OTHERS.
**New herbicides.**
*Res. Rep. 12th annu. N. centr. Weed Control Conf.*, 1955, pp. 173-7.
A summary is given of 46 abstracts on 22 herbicides.—From *Weed Abstr.*, **5**, No. 1798.

d LEMAISTRE, J.
La lutte contre l'*Imperata*. **(*Imperata* control.)**
*Fruits d'Outre Mer*, 1956, **11**: 380-3, bibl. 8, illus.
Mechanical, chemical and cultural methods.

e LUKOSCHUS, F.
Zur Frage der Bienengefährdung durch Unkrautbekämpfungsmittel auf Wuchsstoffbasis. **(The danger to bees from hormone weedkillers.)**
*Z. angew. Zool.*, 1955, No. 2, pp. 183-207, from abstr. in *Bee World*, 1956, **37**, abstr. 302/56.
Normal field applications of Hedonal (Na salt of 2,4-D) were non-toxic to bees.

f MARSILII, H.
Ricerche sulla flora infestante delle colture in Italia. V. La flora infestante di un podere della regione collinare della Val d'Elsa. **(Studies on weeds of crops in Italy. 5. Weeds on a farm in the hill region of Val d'Elsa.)** [English summary ½ p.]
*Nuovo G. bot. ital.*, 1953, **60**: 615-59, bibl. 9 [received 1957].
Includes a list of weeds found in a tobacco crop in a 5-year rotation on alkaline soil.

g MATTHEWS, L. J.
**Dangerous weeds.**
*N.Z. J. Agric.*, 1956, **93**: 226-7, illus.
Including water hyacinth and its control with TCA.

h PARHAM, J. W., MUNE, T. L., AND O'CONNOR, B. A.
***Lantana* and its control in Fiji.**
*Agric. J. Dep. Agric. Fiji*, 1956, **27**: 28-32, bibl. 3, illus.
Biological and chemical control.

i SWEZEY, A. W.
**Baron, a new residual herbicide.**
*Down to Earth*, 1956, **12**(1): 15-16, illus.
For control of vegetation on non-crop areas. [See also *H.A.*, 26: 1673.]

j WARREN, J. C. R., AND OTHERS.
**New herbicides.**
*Res. Rep. east. Sect. nat. Weed Cttee*, Quebec, 1956, pp. 50-1.
Notes on herbicidal activity and crop tolerance of 18 chemicals.—From *Weed Abstr.*, **5**, No. 1769.

## VEGETABLES,* TEMPERATE, TROPICAL AND GLASSHOUSE.

*General.*

(*See also* 1012, 1015, 1027, 1036, 1038, 1045-47, 1056, 1059, 1064, 1065, 1067, 1074, 1183, 1283, 1295, 1360, 1372-76, 1397, 1398, 1410, 1585c, e, f, u, y, 1586a, h, 1959w, 1998, 2000.)

1414. WALKOF, C., NUTTALL, V. W., AND WEIR, F. J.
**Commercial vegetable production in Manitoba.**
*Agric. Inst. Rev.*, 1956, **11**(6): 21-4.
Helped by a geographically central position, by the establishment of a canning industry in 1946, by plant breeding and research at Morden and by availability of good land, steady progress seems assured.

1415. LINGLE, J. C.
**The vegetable areas of America. California's Imperial—Coachella Valleys.**
*Amer. Veg. Gr*, 1956, **4**(12): 8-9, 18-20, illus.
The climate in this region is subtropical desert so that most vegetable production is carried out in winter and early spring. Lettuces and muskmelons are the 2 leading vegetables grown.

1416. RĘBOWSKA, Z., SZCZYPIORSKA, J., AND WOYKE, H.
Wstępne badania nad przydatnością warzyw do mrożenia. **(Preliminary studies on the suitability of certain vegetables for freezing.)**
*Przem. Spoż.*, 1956, No. 5, pp. 200-2, from abstr. in *Polish tech. Abstr.*, 1956, **4**, No. 4504.
Varieties suitable for freezing are given for peas, green, and stringless beans, cucumbers (as salad) and cauliflowers. Tomato in puree form and green dill were found suitable for freezing but not sweet pepper.

1417. SIMMONS, T. H.
**A comparison of the vitamin concentrations of vegetables grown by hydroponics and in soil.**
*J. Miss. Acad. Sciences*, 1951–1953, **5**: 181-4.

* See Editorial Note, p. 164.

Any differences in vitamin content due to rooting media were masked by those due to conditions of light and temperature.

1418. Reinhold, J., and others.
Ergebnisse der Beratung in Moskau über die Erzielung hoher Gemüseernten. **(The results of consultations in Moscow on the achievement of high vegetable yields.)**
*Dtsch. Gartenb.*, 1956, Vol. **3**, Suppl. to No. 11, pp. 19, bibls, illus.

This supplement to *Der Deutsche Gartenbau* is devoted to an account of recent techniques in vegetable growing developed in Communist countries and discussed at the conference on vegetable production which was held in Moscow from 21st to 31st August, 1956. Individual articles deal with the following subjects: Professor Edelstein's (Moscow) method of cutting out blocks from hotbed soil and raising plants from seed in them; the mechanized Mkrtschjan system of hotbed culture; soil heating of vegetables in the field by means of industrial waste heat, and the release of steam from pipes 10–2 cm. above the ground to raise the air temperature during frosty nights; Professor Edelstein's method of weed control by paper strips, with uniformly spaced holes for the seed, laid along the drills and covered with soil; sprinkler irrigation; new Bulgarian tomato varieties; heat treatment of cucumber seed of outdoor varieties; and the utilization of waste heat in vegetable growing.

1419. Artem'ev, G. V.
**Means of reducing the cost of early vegetable production in the Arctic.** [Russian.]
*Sad i Ogorod*, 1956, No. 10, pp. 23-7, illus.

In the Far North early cucumbers and tomatoes can be grown only with the aid of artificial light. Of the methods of illumination tested, the use of luminescent lamps for 16–20 hours daily during the raising of seedlings and later of incandescent lamps to supplement natural light appeared to be the most satisfactory, giving the highest yields at the lowest production cost.

1420. Voronova, A. E.
**Hardening the seeds and seedlings of heat-loving plants.** [Russian.]
*Sad i Ogorod*, 1956, No. 12, pp. 19-21.

In Trans-Urals the short period of frost-free days limits the cultivation of heat-loving vegetables, but hardening the planting material resulted in very satisfactory crop production. Tomato seed soaked for 12 hours and then subjected to alternating warm and cold treatment (12 hours at 15–20° C., 12 hours at 1–5° C.) for 15 days was sown in mid-April in cool frames in 6×6 cm. nutrient blocks. The frames were covered during the night but not by day unless frost was expected. The seedlings were grown in the frames for 30–45 days, were given only P and K fertilizers; they had short internodes and were 12–25 cm. high when planted out on May 20–25. The treatment accelerated fruit maturity by 8–15 days and gave 30–50% higher total yields with a larger proportion of ripe fruits than the controls. Seeds of watermelon, eggplant and cucumber treated in a similar manner gave similar results.

1421. Podešva, J.
Studie o možnostech využití roztoků růstově aktivních sloučenin k postřikům rychlených zelenin. **(Studies on the use of growth substance solutions for spraying forced vegetables.)** [English, Russian and German summaries ½ p. each.]
*Sborn. čsl. Akad. zeměd. Věd, Rostl. Výroba*, 1956, **29**: 737-46, bibl. 10.

Four tomato varieties sprayed 4 times with 0·0025% α-naphthylacetic acid or with the same concentration of 2,3,5-triiodobenzoic acid (TIBA) were earlier and gave 7·1–28% higher yields than the controls sprayed with water. In 2 varieties of glasshouse cucumber spraying with 0·0025% TIBA inhibited terminal growth, but accelerated the formation of side shoots, female flowers and fruits, as a result of which earliness was improved and yields were 22·3–30·2% better than in the controls. Pineapples treated with 0·0005% 2,4-D flowered 6–8 months earlier than the controls treated with water.

1422. Šebánek, J.
O korelativní stimulaci zeleniny směsí kyseliny β-indolylmáselné a nikotinové. **(Correlative stimulation of vegetables with a mixture of β-indolylbutyric and nicotinic acids.)** [English and Russian summaries 14 lines each.]
*Acta Univ. Agric. Silvic., Brno, Ser. A*, 1956, No. 1, pp. 15-21, bibl. 7.

Soaking seed in β-indolylbutyric acid + nicotinic acid at 50, 100 and 200 mg./l. increased the yield of the edible portion of celeriac by 14·5%, of carrot by 23–26%, of cauliflower by 13% and of kohlrabi by 4–22% above that of the controls. The total weight of these crops was, however, not increased in the same proportion and it is considered that this treatment causes differential stimulation of the root, stem and flower organs compared with the leaves.

1423. Geraldson, C. M., and Kelbert, D. G. A.
**The effect of nitrogen source on the yield and quality of vegetables.**
*Proc. Soil Sci. Soc. Fla, 1955*, **15**: 130-7, bibl. 12.

Cabbage, tomato, cucumber, cantaloupe, pepper and pole bean crops were grown for at least 2 seasons in a 4-year period of field plots of fine sandy loam soil receiving sodium nitrate, ammonium nitrate, ammonium sulphate or calcium nitrate as the source of N in an 8–6–8 fertilizer. Pole beans were adversely affected by sodium nitrate; they produced the best yield and quality with ammonium nitrate. Ammonium nitrate or ammonium sulphate was best for cucumbers. Similar but lesser responses were shown by tomatoes, peppers and cantaloupes. Cabbage crops did not show any consistent response to N sources. Generally superior quality was associated with the highest yields, which were usually associated with applications of ammonium nitrate.—Gulf Coast Exp. Stat., Bradenton, Fla. J.R.L.

1424. van den Ende, J.
Stikstofvoeding van groenten en fruit onder glas. **(Nitrogen nutrition of vegetables and fruit under glass.)** [English summary 20 lines.]
*Meded. Dir. Tuinb.*, 1956, **19**: 656-66, bibl. 13, illus.

The author discusses the N requirements of spring and autumn lettuces, tomatoes and grapes, with particular reference to the effect of the osmotic condition of the soil on growth response to N.—Proefst. Groent. Fruit. Glas, Naaldwijk.

1425. Penningsfeld, F., and Kurzmann, P.
**Gemüse-Düngungsversuche mit Hyperphos. (Experiments on vegetable manuring with "Hyperphos".)**
Reprinted from *Süddtsch. ErwGärtn.*, 1956, Vol. **10**, No. 31, pp. 4, illus.

Two years' further trials with Hyperphos, a crude phosphate of African origin [see *H.A.*, 24: 2185], showed that watering peat with a solution of the fertilizer 3 months before planting greatly enhanced P availability in comparison with the application of equivalent amounts of Hyperphos, bone meal or Thomas phosphate immediately before planting. Data are presented on yield and $P_2O_5$ uptake of beans, endive, black radish and spinach grown in a mixture of quartz sand and peat, with or without the fertilizers.—Staatl. Lehr- u. Forschungsanst. f. Gartenbau, Weihenstephan.

1426. Podešva, J.
Studie o možnostech mimokořenové výživy rychlené zeleniny. **(Studies on foliar nutrition of forced vegetables.)** [English and Russian summaries 7 and 9 lines respectively.]
*Acta Univ. Agric. Silvic., Brno, Ser. A*, 1956, No. 2, pp. 83-92, bibl. 13, illus.

Repeated foliage spraying with a 0·5–0·75% mixture of $Mg(NO_3)_2$ and $Fe_3(PO_4)_2$+0·0025% $\beta$-indolylacetic acid or with similar solutions of commercial fertilizers improved earliness and increased the yields of frame-grown cucumber, pepper and lettuce by 8–26% above that of the controls. The controls were watered with corresponding nutrient solutions and sprayed with water.

1427. Elliott, I. L., and Hupkens van der Elst, F. C. C.
**The use of copper on Rukuhia peat.**
*N.Z. J. Agric.*, 1956, **93**: 550-7, bibl. 2, illus.

Carrots, spinach, broad beans and turnips were among the test plants in a copper-nutrition trial. Cu deficiency symptoms are described. Spinach and broad beans supplied with sufficient Cu were more resistant to frost than deficient plants.

1428. Vergnano, O.
Effetti di alte concentrazioni di nichel su alcune piante da cultura. **(Effects of high concentrations of nickel on some crop plants.)** [English summary ¼ p.]
*Nuovo G. bot. ital.*, 1953, **60**: 189-96, bibl. 4, illus. [received 1957].

Symptoms of Ni toxicity are described for various crops grown on Whitecairns serpentine soil near Aberdeen. Cabbages were chlorotic and showed necrotic patches; broad beans, apart from being stunted, were not visibly affected, although the Ni content of the leaves was as high as 146 p.p.m. of dry matter. Similar results were obtained by using nutrient solutions containing 2·5 p.p.m. of Ni.—Macaulay Inst. Soil Res., Aberdeen.

1429. Jamison, F. S.
**Irrigation of vegetables in Florida.**
*Proc. Soil Sci. Soc. Fla, 1955*, **15**: 173-5.

Various methods of irrigating vegetable crops are described. Experiments with cucumbers, cabbages, beans, onions and tomatoes showed that yield and quality of crops were improved by irrigation. In some cases, however, probably owing to leaching of plant nutrients, heavy applications of water resulted in lower yields than moderate applications. The effect on soil temperature of lowering or raising the water table is discussed. It was observed that an infestation of aphid occurred on non-irrigated cabbages, whereas irrigated plants were perfectly healthy.—Fla agric. Exp. Stat., Gainesville. J.R.L.

1430. Soboleva, I. M., and Pel'tihin, S. V.
**The use of colliery waters for irrigation.** [Russian.]
*Sad i Ogorod*, 1956, No. 11, pp. 30-3.

Colliery waters in the Donbas contain various salts such as sodium, magnesium and calcium chlorides and sulphates and calcium and magnesium hydrocarbonates. On permeable soils waters containing up to 0·3 g./l. chloride ion at 2·5–3 g./l. of total salt content are considered safe for irrigation, while in some cases on fertile soils applications of water containing 0·6 g./l. chloride ion at 4 g./l. total salt gave high vegetable yields. On collective farms where colliery water was used for many years an increase in the soluble salt content of the soil was noted at the end of each irrigation season amounting to 0·15–0·20%, but it was found that this was not cumulative as during the winter a large part of it was leached out by rain. Cabbage, tomato and cucumber irrigated 4–8 times per season with colliery water at 300–400 cu. m./ha. per application gave very satisfactory yields. [For orchard irrigation with colliery water see *H.A.*, 26: 222.]

1431. Peck, N. H.
**Evapo-transpiration rates for vegetable crops in New York State and some relationships with climatological data.**
*Diss. Abstr.*, 1956, **16**: 1552-3, being *Publ.* 18,283 of 244 pp.

As part of an experiment on supplemental irrigation the evapo-transpiration rates for irrigated peas, alfalfa, tomatoes, cabbage and sweet corn were determined, and some relations with weather data examined. Peas had a peak evapo-transpiration rate of 0·19 in. per day at the end of June. The rate for tomatoes increased very rapidly during July to a peak of 0·207 in. per day in late July. Cabbage had a peak rate of 0·167 in. per day in mid-August. A close relationship was apparent between evaporation and solar radiation, and between evaporation and vapour pressure deficit during April to September.—Cornell Univ.

1432. Pridham, T. G., and others.
**Antibiotics against plant disease. II. Effective agents produced by *Streptomyces cinnamomeus* forma *azacoluta* f. nov.**
*Phytopathology*, 1956, **46**: 575-81, bibl. 15, illus.

A new form of *S. cinnamomeus* was found to produce

a mixture of antibiotics that were antagonistic to several pathogenic bacteria and fungi, including those causing rust, anthracnose, downy mildew and powdery mildew of beans.—Agric. Res. Serv., U.S.D.A., Peoria, Ill. [For part I see note 1371r.]

1433. Ark, P. A., and Wilson, E. M.
**Movement of streptomycin into plant tissues from streptomycin-pyrophyllite formulations.**
From abstr. in *Phytopathology*, 1956, **46**: 634.

In tests with beans and cucumbers a differential penetration of streptomycin into the tissues was observed with different streptomycin dust formulations.

1434. Overman, A. J., and Burgis, D. S.
**Allyl alcohol as a soil fungicide.**
*Phytopathology*, 1956, **46**: 532-5, bibl. 18, illus.

Allyl alcohol, used as a pre-planting drench on vegetable seedbeds, was highly effective in controlling damping-off organisms. This was partly due to the fact that it favoured the establishment of *Trichoderma* spp.—Gulf Coast Exp. Stat., Bradenton, Fla.

1435. Besmer, A. F. H., and Oostenbrink, M.
Phytotoxische en nematicide nawerking van grondontsmettingen met DD. **(Phytotoxic and nematocidal residual effects of soil sterilization with D-D.)**
*Meded. LandbHoogesch. Gent*, 1955, **20**: 279-89, from abstr. in *Z. PflKrankh.*, 1956, **63**: 675.

It is generally stated that a waiting period of 4–6 weeks is sufficient after soil fumigation with D-D (40–60 c.c./m²). The authors found, however, that in some cases, e.g. with loam soils, inhibition of growth may occur even after 6 months, deep-rooting plants such as carrots and scorzonera being particularly susceptible. In the case of *Hoplolaimus uniformis* and *Pratylenchus penetrans* the fumigant remained effective for 2–3 years, while the after-effect of chloropicrin was limited to 2 years.

1436. Crittenden, H. W.
**Control of *Meloidogyne incognita acrita* by crop rotations.**
*Plant Dis. Reptr*, 1956, **40**: 977-80, bibl. 4.

Trials over the period 1952–55 have shown that the best rotations for control of *Meloidogyne incognita acrita*, based on the amount of root-knot on cantaloupe in 1955, are one of the following, involving 2 or 3 consecutive years of resistant crops: (a) *Crotalaria spectabilis*, Blackhawk soybean, and clean cultivation followed by Monroe soybean; (b) two years of Blackhawk soybean; or (c) *Crotalaria spectabilis* and Monroe soybean. One year of a resistant crop results in some control on a susceptible crop the next year.—Delaware agric. Exp. Stat., Newark.

1437. Chaudhary, S. A.
**Comparative study of various methods of application of some systemic insecticides.**
*Agric. Pakist.*, 1956, **7**: 114-27, bibl. 15.

In greenhouse tests the effects of several insecticides against cabbage and pea aphids were evaluated. Three seed treatments, soil treatments and foliage sprays were applied. Seed treatments had longer and greater residual effects than soil or foliage treatments. Of the seed treatments the use of charcoal as a carrier had a longer residual effect than soaking or direct treatments. In pea seed treatments schradan, demeton and Am. Cyanamid 12008 gave equal residual effects, while in soil and foliage treatments schradan and demeton had the longest residual effects. For control of cabbage aphid Am. Cyanamid 12008 gave the best results.

1438. Gilpin, G. L., Parks, A. B., and Reynolds, H.
**Flavor of selected vegetables grown in pesticide-contaminated soils.**
*J. agric. Food Chem.*, 1957, **5**: 44-8, bibl. 14.

Undesirable off-flavors were detected in carrots, turnips, and green beans which were grown without insecticide treatment in soils contaminated with residues of technical benzene hexachloride (BHC) or lindane applied to preceding crops. Soil residues of the alpha, beta, and delta isomers of BHC also resulted in off-flavors in carrots. Heavy residues of aldrin (both technical and purified), dieldrin, heptachlor, Dilan, toxaphene, chlordan, endrin, isodrin, TDE, technical DDT, and methoxychlor did not cause significant flavor changes. [Authors' abstract.]—Human Nutrit. Res. Br., agric. Res. Serv., U.S.D.A.

1439. Krammer, A., and Ditman, L. P.
**A simplified variables taste panel method for detecting flavour changes in vegetables treated with pesticides.**
*Food Tech.*, 1956, **10**: 155-9, from abstr. in *Food Sci. Abstr.*, 1956, **28**, No. 1550.

A simplified variables procedure is proposed, which eliminates a large part of the usual computations while retaining most of their efficiency. Results obtained with 5 products, untreated or treated with 1 of 6 pesticide formulations, showed that the simplified method required substantially fewer tastings, and provided more information on the direction and importance of the differences, than did triangular taste tests.

1440. Bremer, H.
Stengelgrundbeschädigung bei Überdosierung von insektiziden Streumitteln. **(Stem injuries resulting from an overdose of insecticidal dusts.)** [English summary 3 lines.]
*Z. PflKrankh.*, 1957, **64**: 93-6, illus.

Under conditions of a dry soil an overdose of a lindane dust preparation (2–8 g. per plant) applied at soil level to the stems of tomato and cauliflower plants caused girdling and other injuries in the root collar region leading to breakage. Chlordane proved less, and aldrin much less harmful.—Inst. Gemüsebau Unkrautforsch., Neuss-Lauvenburg.

### *Artichokes.*

1441. Bachmanowa, S., and Tabin, S.
Ocena przydatności 15 klonów różnych odmian bulwy (*Helianthus tuberosus* L.) dla przemysłu gorzelniczego. **(Estimation of the suitability of fifteen clones of several varieties of Jerusalem artichoke for distillery purposes.)** [Russian and English summaries 2 pp. and 1½ pp. respectively.]
*Ann. Univ. M. Curie-Skłodowska, Sect. E*, 1956, **10**: 301-21, bibl. 25, illus.

Fifteen clones of Jerusalem artichoke varieties were compared at Pulawy Institute of Plant Breeding. White varieties produced more tubers and green matter than red or yellow varieties. The white clones nos. 4, 6 and 14 and the red clone no. 16 yielded from 2,459 to 3,687 kg./ha. of sugar. Ethanol contents were high in the clones 4, 9, 11, 12, 13 and 14. The highest yields of tubers and alcohol were obtained from clones with white, rather elongated tubers (nos. 4, 14, 11 and 6). The tubers may be left in the ground until the following spring, but must then be dug as early as possible to avoid depletion of the reserves.

### *Asparagus.*

(*See also* 1399, 1400.)

1442. Perraudin, G.
Étude sur le rendement de l'asperge. (**A study on asparagus yields.**) [German, English and Italian summaries 4–6 lines.]
*Landw. Jb. Schweiz.*, 1956, **5**: 613-18.

In variety trials in 1955, two selections of the variety Hâtive d'Argenteuil gave the best yields. Male plants were more productive than females.—Lausanne.

1443. Keuls, M., and Post, J. J.
Invloed van de temperatuur op de groei van asperges. (**The effect of temperature on asparagus growth.**) [English summary ¾ p.]
*Meded. Dir. Tuinb.*, 1956, **19**: 827-45, bibl. 5, illus.

Temperature measurements taken in an asparagus bed during May and June showed that fluctuations near the surface were great and even at a depth of 27 cm. could reach 5° C. during the day. The rate of growth of white asparagus followed the fluctuations in temperature, and was greatest when the temperature just below the tip reached a maximum. When the beds were covered with reed mats growth and temperature fluctuations were reduced. The effect of temperature change on growth rate was immediate. Comparison of data on the supply of asparagus at the auction at Nijmegen with data on daily temperatures from the Royal Netherlands Meteorological Institute showed that peaks of supply followed peaks of high temperature at about 2 days' interval.

1444. D'Amato, F.
Studio anatomico delle reazioni indotte dalla decapitazione combinata a 2,4-D in turioni di *Asparagus officinalis* L. (**Anatomical study of reactions induced in young shoots of *Asparagus officinalis* by decapitation combined with 2,4-D treatment.**) [English summary 1½ pp.]
*Nuovo G. bot. ital.*, 1953, **60**: 660-79, bibl. 38, illus. [received 1957].

Young decapitated asparagus shoots treated at the cut surface with 1–2% 2,4-D in lanolin responded in various ways, including bending, tumour formation, fasciation and gummosis with bending or longitudinal splitting, and in a few instances sprouting of lateral buds. Survival was significantly longer than when no 2,4-D was added to the lanolin. Neither decapitation nor 2,4-D stimulated cell division. Lignification and suberization frequently followed application of 2,4-D.

### *Brassicas.*

(*See also* 1085o, 1428, 1429, 1431, 1437, 1440, 1585i, j, s, t, v, 1586e, f, 1964, 1996.)

1445. Wood, P. D.
**Brassicas.**
*Rep. Rosewarne exp. Hort. Stat. 1952-55*, [1956], pp. 19-24.

*Broccoli.* Variety trials; spacing at 3 ft. square gave the best curd size and quality, but yields were lower than at closer spacings; dates of sowing and planting had a marked effect on time of cropping but no effect on curd quality was observed; the seed rate giving the most satisfactory result was 1 oz. per 160 ft. of row. *Spring cabbage.* Sowings of "First Early Market" in early and mid-July produced plants fit to cut as greens in late November or December; nitrogen applications in late January and late February improved crop weight. *Nutrition.* A Roscoff broccoli variety showed little response to N and a comparatively large response to $P_2O_5$; highest yields of spring cabbage were obtained from plots receiving NPK and/or farmyard manure. *Pests and diseases.* Cabbage stem weevil (*Ceuthorhynchus quadridens*) in broccoli seedbeds was effectively controlled by 1 or 2 applications of dieldrin or aldrin; satisfactory control of larvae of cabbage white butterfly was obtained by dusting with DDT at fortnightly intervals before early September; "Carclew's Universal" is a brussels sprout variety markedly resistant to ring spot fungus (*Mycosphaerella brassicicola*). *Cold storage.* Broccoli was kept in good condition for up to 3 weeks at 32° F. and about 100% r.h.

1446. Collyer, J. E.
**Brussels sprouts.**
*J. Agric. Vict.*, 1956, **54**: 593-4, illus.

Variety trials during 3 seasons have shown that there is no difference in yield between the local Fillbasket type of brussels sprouts and Long Island, Early Morn, Universal and other overseas varieties, though some of the latter are more suitable for processing. J.R.L.

1447. Finch, C. G.
**Winter cauliflower trials in the South West; Nos. 4 and 5 periods: 1949/50–1953/54.**
*J. nat. Inst. agric. Bot.*, 1956, **7**: 624-33.

Ten trials each of No. 4 period (maturing April) and No. 5 period (maturing May) winter cauliflower (Roscoff Broccoli) were carried out in the South West of England during 1949–54. Seven varieties were tested in each group. The No. 5 period varieties matured on an average about 2 weeks later than the others. Yields of marketable heads, percentages of various quality grades, times of heading, general botanical characters and resistance to frost and diseases are reported. J.R.L.

1448. Mrożewski, S., and others.
Badania różnych odmian kapusty świeżej, kopcowanej i kiszonej. (**Studies on varieties of cabbage, fresh, stored and fermented.**) [English and Russian.]
*Przem. Spoż.*, 1956, No. 2, pp. 69-72, from abstr. in *Polish tech. Abstr.*, 1956, **4**, No. 4499.

The composition of the same varieties of late cabbage

grown in more than 10 localities in Poland did not differ appreciably. Four months' storage in clamps resulted in a decrease of dry matter content from 10 to 8·2%, of sugar from 5·2 to 4% and of vitamin C from 46 to 29 mg. %.

1449. Yen, D. E., and Priestley, W. G.
**The selection of cabbage strains for N.Z. conditions.**
*N.Z. Comm. Gr*, 1956, **12**(5): 1, 3, 5, illus.

By careful selection of heads for seed production for 8 seasons a strain of Best of All savoy was obtained which, under ideal conditions, gave 98% marketable heads. Similar seed distributed to market growers also produced superior crops.—Crop Res. Div., D.S.I.R. J.R.L.

1450. Squibbs, F. L.
**The frequency of occurrence of "off-type" plants in savoy seed stocks.**
*J. nat. Inst. agric. Bot.*, 1956, **7**: 634-8, bibl. 1.

This report gives the results of an investigation in 1953 into the frequency of "off-type" plants in 120 commercial seed stocks of savoy cabbage grown under comparable conditions at 4 centres. The percentage of "off-types" was higher in early than late season varieties, namely 8·5–12·1% compared with 5·1–6·6%. The average percentage of "off-types" for all stocks of 34 varieties was 7·6. [For earlier work see *H.A.*, 23: 3034.] J.R.L.

1451. Cvetaeva, E. M.
**The effect of organo-mineral granules on cabbage yields in northern regions.** [Russian.]
*Doklady vsesojuz. Akad. seljsk. Nauk*, 1956, **21**(8): 24-7, bibl. 8, illus.

In the Tjumen province in 1952 and 1953 the cabbage variety Normer pervij, raised in nutrient blocks, was given at the time of planting 100 g. humus (control), 100 g. of small granules 0·3–0·8 mm. in diameter, and one large, 100 g. granule 5–5·5 cm. in diameter, per plant. The granules were made of humus, N, $P_2O_5$, $K_2O$, water and cow manure. During 1952 growing conditions were unfavourable and the small and large granules gave 87 and 121% yield increases respectively over the controls. The 1953 season was good and yield increases due to the 2 types of granulated fertilizers were only 19 and 22% respectively.

1452. Hewitt, E. J., Agarwala, S. C., and Williams, A. H.
**Molybdenum as a plant nutrient. VIII. The effects of different molybdenum levels and nitrogen supplies on the nitrogen fractions in cauliflower plants grown in sand culture.**
*J. hort. Sci.*, 1957, **32**: 34-48, bibl. 14.

Cauliflower plants var. Majestic were grown in sand culture with nitrate, nitrite, ammonium compounds, ureal or glutamic acid as sources of N at deficient, normal and high levels of Mo. Total N contents increased with increase in Mo supply in plants grown with nitrate. Similar changes occurred in plants aged 78 days given other N sources, but were not revealed in plants aged 145 days. Plants with nitrate usually contained much less total N than those grown with other sources of N. Nitrate content greatly increased in plants given nitrate with inadequate Mo supply. Other plants contained small or negligible amounts of nitrate. Protein and total organic N were decreased by Mo deficiency in plants grown in nitrate. Mo-deficient plants grown with ammonium compounds or urea usually contained as much protein, α amino N and total organic N as normal plants grown with nitrate and adequate Mo. Mo deficiency resulted in decreases in the concentration of glutamic acid in plants grown with nitrate; under these conditions cysteic acid appeared, especially in mature leaves. Plants grown with ammonium compounds or urea contained relatively high concentrations of arginine. Mo deficiency resulted in marked increases in concentrations of arginine and often of other amino acids in plants given these sources of N. Free adenine concentrations were greatest in plants given ammonium sulphate and were significantly less in those given nitrite or nitrate. Mo deficiency decreased the adenine concentration only in plants given nitrate. It is concluded that whiptail symptoms of Mo deficiency in cauliflower are not caused by deficiencies of adenine, or of total α amino acid, organic or protein N fractions. The possibility that accumulation of a specific amino acid compound may be associated with the occurrence of whiptail is discussed, and merits further investigation. [Authors' summary.—Long Ashton Res. Stat. [For part VII see *H.A.*, 27: 549.]

1453. Partsch, G.
Molybdänmangel an Blumenkohl in Deutschland. **(Molybdenum deficiency of cauliflower in Germany.)**
*Thesis Inst. Phytopath., Justus-Liebig-Hochschule, Giessen*, 1955, pp. 120, from abstr. in *Z. PflKrankh.*, 1956, **63**: 650-1.

Only recently it has been found that in Germany symptoms of molybdenum deficiency in cauliflower are widespread and not confined to any particular type of soil. Applications of 4–6 kg. sodium molybdate were required to correct Mo deficiency in certain heavy soils, while 2 kg. sufficed for light soils. Treatment of the seedbed with small amounts of sodium molybdate (0·8–1·0 g./m²) prevented the appearance of symptoms when the plants were later grown in deficient soil. A favourable effect of $PO_4$ ions on Mo availability, noted by workers abroad, was not confirmed. Increases in N did not greatly affect deficiency symptoms, but applications of ammonium sulphate aggravated them severely, probably owing to the unfavourable effect of $SO_4$ ions on Mo absorption. Different varieties were shown to vary greatly in their responses to conditions of severe Mo deficiency.

1454. Lowe, A. D.
**Control of brassica seed crop aphides.**
*N.Z. J. Agric.*, 1956, **93**: 256.

Experiments have shown that kale plants sprayed with lindane yielded over 3 times more seed pods per plant than unsprayed plants, and that pods from plants free of the cabbage aphid (*Brevicoryne brassicae*) contained 20 times more seed. It is recommended that lindane (½–1 lb. active ingredient per acre) should be applied in the autumn as there is a hazard to bees if it is applied in the spring.—D.S.I.R., Ashburton. J.R.L.

1455. Lowe, A. D.
**Insecticides applied to crops in flower can poison bees.**
*N.Z. J. Agric.*, 1956, **93**: 229-30.
Bee colonies were severely damaged when in the spring a brassica seed crop, 75–1,000 yd. away, was dusted from the air with lindane (½ lb. active ingredient per acre).—D.S.I.R., Ashburton. J.R.L.

## *Celery.*

(*See also* 1585v.)

1456. Westgate, P. J.
**Nitrogen in celery fertilization.**
*Proc. Soil Sci. Soc. Fla, 1955*, **15**: 86-90, bibl. 5.
Maximum crops of celery were produced on the Leon fine sandy soil of the Sanford area following the application of 300–500 lb./acre of nitrogen. The yield was greatly increased, in some cases nearly trebled, when the N was applied as sodium or calcium nitrate rather than as ammonium sulphate or nitrate. The addition of lime with the ammonium sulphate did not increase the yield. Excessive nitrogen from ammonium salts produced stunted plants with short downcurving petioles and curled leaves.—Centr. Fla Exp. Stat., Sanford. J.R.L.

1457. Geraldson, C. M.
**Calcium sprays control blackheart of celery.**
*Market Grs' J.*, 1956, **85**(10): 8-9, illus.
Recent research at the Gulf Coast Experiment Station, Florida, shows that a deficiency of Ca is a fundamental cause of blackheart of celery. The disorder can be prevented by maintaining a high level of soluble Ca in the soil, but if excess salts are present (over 4,000 p.p.m. total soluble salts) adding Ca to the soil is not recommended. Ca can be sprayed directly into the hearts of the plants, using 10–20 lb. Ca nitrate or 5–10 lb. Ca chloride per 100 gal. water per acre.
J.R.L.

1458. Burdine, H. W.
**A study of magnesium deficiency chlorosis in certain varieties of green celery.**
*Diss. Abstr.*, 1956, **16**: 1309-10, being *Publ.* 16,249 of 250 pp.
Factors affecting the occurrence of a chlorosis in some varieties of green celery grown in the peat soils of New York were investigated. In nutrient studies it was indicated that at 1 me Mg./litre susceptible varieties showed considerable chlorosis, while non-susceptible varieties showed little or no chlorosis. Varying levels of Ca and K were supplied when Mg was maintained at 1 me/litre, and differences in response were observed between chlorotic and non-chlorotic varieties. When nitrate and sulphate levels were varied in the nutrient solution, there was a significant response to nitrate levels by chlorotic varieties, but no response to variable sulphate levels by any variety was apparent. In all varieties decreasing Mg levels increased top/root ratio. Analyses for K, Ca and Mg were made on stem, leaves petioles and roots of chlorotic and non-chlorotic varieties, grown in a modified Hoagland's No. 2 solution. Stems had the highest Mg content at all levels of Mg application, and roots had the lowest content. As Mg levels decreased the Mg content of all plant parts decreased. Magnesium in the roots of chlorotic varieties at the lowest level of Mg was rather higher than in the non-chlorotic variety, in petioles and leaves Mg was higher in the non-chlorotic variety. The non-chlorotic variety seemed better able to absorb the Mg it required from the nutrient medium. In field experiments the most feasible method of correcting the chlorosis was by foliar application of 2 to 3% magnesium sulphate at intervals of 1 to 2 weeks during the final 60 to 70 days of the growing season.

1459. Thomas, J. D., and Bevan, W. J.
**Investigations into the control of carrot fly on celery.**
*Plant Path.*, 1956, **5**: 115-19, illus.
Experiments started in 1951 on the Lancashire moss lands [see *H.A.*, 25: 1676] were continued during 1953–55, using aldrin and dieldrin in addition to *gamma*-BHC. Drenching the soil round the plants with *gamma*-BHC or with miscible oil formulations of aldrin or dieldrin was consistently effective. Dipping the plants was more convenient than drenching, and for this purpose *gamma*-BHC w.p. was the most successful material used; control was improved by spraying once or twice after planting out. Spraying alone, especially with 0·1% dieldrin miscible oil at 100 gal. p. acre, also gave effective control, but 3 applications were needed. Low percentage *gamma*-BHC or aldrin dusts incorporated in soil gave good results in the experiments but growers' results have been inconsistent.—N.A.A.S., Leeds.

1460. Randolph, J. W.
**Mobile celery harvesting-packing combine saves labor; speeds operation.**
*Agric. Engng St. Joseph, Mich.*, 1956, **37**: 755-8, illus.
An illustrated description is given of a mobile celery harvesting and packing combine developed in Florida for use on large specialized farms. A team of 58 workers operates the combine which eliminates the need for a central packing house and reduces the time between harvesting and precooling for transport.

## *Cucurbits.*

(*See also* 1056, 1295, 1426, 1429, 1433, 1585d, g, m, 1586j, l.)

1461. Hockey, K. C.
**Massey College trial with soil warming for forced production.**
*N.Z. Comm. Gr*, 1956, **12**(6): 3, illus.
A method which has been used for forced cucumber production is described. Bales of wet hay or straw are used for heat generation.

1462. Ito, H., and Saitô, T.
**Factors responsible for sex expression in Japanese cucumber. IV. The role of auxin in plant growth and sex expression.** [Japanese, with English summary ¼ p.]
*J. hort. Ass. Japan*, 1956, **25**: 141-51, bibl. 5, illus.
Cucumber plants in a cold bed were sprayed with NAA at 10 p.p.m. at 2-, 4-, 6- or 8-day intervals for a period of 40 days. The shorter the intervals, the more was male flower formation retarded and female flower formation accelerated. Under short-day conditions

(8 hr.) at 2- and 4-day interval applications, and under long-day conditions (15 hr.) at 2-day interval applications, no male flowers were formed and the first female flower appeared at the fourth node. In another experiment sprays of NAA at 10 p.p.m. were applied at 4-day intervals from 1 to 10 times. Female flower formation increased and male flower formation decreased with increasing number of applications. With 9 applications no male flowers were formed and the first female flower was formed at the fourth node. It is concluded that the auxin level in the cucumber plant is responsible for sex expression, high auxin levels restricting male flower formation and encouraging female flower formation. [For parts I, II and III see *H.A.*, 24: 2667, 25: 1680 and 27: 440.]

1463. TERMAN, G. L., AND OTHERS.
**Crop response to NPK fertilizers varying in granule size and water solubility of the phosphorus.**
*Proc. Soil Sci. Soc. Amer.*, 1956, **20**: 551-6, bibl. 8.

The crops tested included cucumbers, which were very little affected by granule size but showed yield increases significantly correlated with the water-soluble P content of the fertilizer.

1464. STARK, F. C.
**Foliar feeding of Maryland melons.**
*Amer. Veg. Gr*, 1956, **4**(9): 22-3, illus.

Six years' experiments have shown that the percentage of soluble solids in melons and the number of high quality fruits can both be increased by foliar sprays of magnesium sulphate (4 lb. per acre) and borax (2 lb. per acre) when the vines begin to run and again when the early fruit is 2 in. in diameter.—Univ. Md.
J.R.L.

1465. ITAGI, T., AND HIKI, M.
**On the occurrence of deformed fruits in cucumbers. 1. The influence of some cultural practices on the occurrence of the deformities.** [Japanese, with English summary ½ p.]
*Bull. Kanagawa agric. Exp. Stat. hort. Sect.*, 1956, No. 4, pp. 72-8, bibl. 12, illus.

When various cultural practices were applied to Sagami Hanjiro cucumbers it was found that foliage sprays of urea decreased, whereas leaf cutting increased, the occurrence of deformed fruits, and that there was also a higher proportion of deformed fruits on plots lightly fertilized than on plots that had received heavy applications. The number of deformed fruits increased as the season progressed and the deformed fruits took longer than normal ones to mature. When vinyl film was put over some plants to reduce ventilation and increase temperature, large numbers of deformed fruits of different types developed. Eight types of deformity are described.
J.R.L.

1466. ELLIS, D. E.
**Melon diseases.**
*Amer. Veg. Gr*, 1956, **4**(9): 16, 21, illus.

Downy mildew (*Pseudoperonospora cubensis*), powdery mildew (*Erysiphe cichoracearum*), anthrachnose (*Colletotrichum lagenarium*), bacterial wilt (*Erwinia tracheiphila*), root knot nematodes (*Meloidogyne* spp.) and mosaic virus are described and control measures are recommended.—N.C. agric. Exp. Stat.
J.R.L.

1467. KRISTENSEN, H. R.
Virussygdomme hos agurker i Danmark.
**(Virus diseases of cucumbers in Denmark.)**
[English summary ¼ p.]
*Horticultura*, 1956, **10**: 161-72, bibl. 53, illus.

*Cucumis virus 1* was already observed in cucumber in Denmark in 1918, and has since then been found in numerous other plants. Virus isolates from 6 different sources (*Ajuga*, anemone, gladiolus, primula, viola and trollius) were inactivated by 10 minutes' exposure to 60° C. The isolate causing most severe symptoms in cucumber was derived from trollius. Systemic symptoms occurred on cucumber plants 5–6 days after the inoculation. *Cucumis virus* 2 has only recently (in the current year) been found in Denmark, where severe and widespread attacks occurred in many nurseries. Several attempts to infect *Nicotiana tabacum*, *N. glutinosa*, *Datura stramonium*, *Vigna sinensis* and *Chenopodium amaranticolor* yielded negative results. In most cases systemic symptoms occurred in cucumber plants 10–11 days after the inoculation. The virus kept its infectivity in dry leaf tissues and was not inactivated by 10 minutes' exposure to 90° C.; it reacted strongly with antiserum prepared against tobacco mosaic virus. [From author's summary.]—Danish Res. Stat. for Plant Diseases and Pests.

1468. ARK, P. A., AND THOMPSON, J. P.
**Action of certain antibiotics on downy mildew of cucumber.**
From abstr. in *Phytopathology*, 1956, **46**: 634.

Downy mildew of cucumber, caused by *Pseudoperonospora cubensis*, was successfully controlled under greenhouse conditions by endomycin, gramicidin S, patulin and streptomycin. Terramycin gave 70–75% control, polymyxin (100 p.p.m.) gave 70% control, and mycostatin (500 p.p.m.) gave 90% control. No control was obtained with aureomycin, bacitracin, Chloromycetin, granicidin, griseofulvin, neomycin, penicillin G or tetracycline.

1469. MACCOLLOM, G. B.
**Effects and correction of DDT phytotoxicity to cucumbers.**
*Mem. Cornell agric. Exp. Stat.* **339**, 1956, pp. 48, bibl. 45, illus.

In studies carried out since 1951 on DDT phytotoxicity to cucurbits, mainly the cucumber variety Niagara, a purified DDT dust was less phytotoxic than a technical DDT dust, but the phytotoxicity of the latter was reduced by the addition of activated charcoal. A technical DDT wettable powder formulated with ground tobacco stems was more phytotoxic than one formulated with an inorganic diluent. DDT w.p. sprays were in general less phytotoxic than DDT dusts. The phytotoxicity of w.p. sprays was not reduced by the addition of charcoal and was increased by the use of B-1956, but not of soya bean flour, as a sticker. The addition of activated charcoal to 2% DDT dust produced a significant increase in yield with the cucumbers A and C, Marketer, Niagara and National Pickling, but not with Yorkstate Pickling. Experiments showed that DDT injury is primarily associated with its *ortho para* and *para para* isomers, the former being approxi-

mately twice as phytotoxic at the latter. Results indicated an accumulation of nitrate N and a depression of Ca in the chlorotic foliage of DDT-treated plants compared with normal foliage of untreated plants. Tests showed that the addition of activated charcoal to DDT wettable powder reduced its toxic contact effect on the pea aphid and southern armyworm, but did not alter its toxic stomach action on the latter.

J.R.L.

1470. Chroboczek, E., and Woyke, H.
Wpływ częstości sprzętu na wysokość i jakość plonu kilku odmian ogórków konserwowych. (**The influence of the frequency of picking on the yield and grade of several pickling cucumber varieties.** [English summary 2 pp.]
*Roczn. Nauk rol.*, 1956, **73**: 366-89, bibl. 9.

The results of experiments by workers in the Department of Vegetable Crops of the Warsaw College of Agriculture, Skierniewice, in the years 1950–52, in which frequency of gathering pickling cucumbers was varied from 1 to 2–3, 3–4, or 5 days, are set out in some detail and deductions are made on the most economic periodicity to suit Polish factory conditions. Briefly the actual results were as follows: 1. As frequency of picking increased from picking every 3 days to picking daily the average increase in number picked rose by 20%, while the yield weight per ha. decreased 24%. This held good every year for all varieties. 2. Increasing the interval between pickings to 5 days resulted in fewer cucumbers than at 3 days and a 20% decrease in total weight of crop. 3. As frequency increased from every 3 days to daily the yield of fruit for canning (length 8–12 cm., diameter not more than 4·5 cm.) rose considerably both in number and weight of cucumbers. 4. As the frequency rose from 3 days to 1 day, the yield of fruit too large for canning but suitable for dill pickles fell every year and in all varieties. 5. As frequency rose from every 3 days to daily the total yield of canning and dill pickle fruits fell. 6. With daily picking the percentage of yellowing fruit in the total yield was very much lower than with less frequent picking. 7. Frequency did not influence the percentage of deformed or diseased fruit. 8. Picking daily was about twice as expensive in labour as picking every third day.

1471. Raman, K. R.
**A note on seed production in bittergourd.**
*South Indian Hort.*, 1956, **4**: 26-7.

In general the larger the fruit of *Momordica charantia* the higher is the number of mature seeds contained, thus the large mid-season fruits should be selected for seed and the smaller early and late ones used as vegetables.

### *Legumes.*

(*See also* 1018, 1019, 1031, 1037, 1055, 1058, 1084k, 1085f, n, 1363, 1401-5, 1425, 1427, 1429, 1431-3, 1437, 1438, 1585b, n, o, q, 1586b, c.)

1472. Squibbs, F. L.
**A description of some dwarf french bean varieties.**
*J. nat. Inst. agric. Bot.*, 1956, **7**: 639-48, bibl. 4, illus.

Twenty-one dwarf French beans appearing for the first time in British catalogues between 1950–53 were grown and classified into 19 distinct types, descriptions of which are given. The major diagnostic characters used are the size, shape and colour of seeds and pods, while habit, foliage, flower and hypocotyl colour assist in identification. A key to these 19 varieties also includes the 28 varieties described in an earlier paper [*H.A.*, 23: 3066]. Photographs are given of the seeds of the 47 types. [Author's summary.]

1473. Bocanegra S., S.
Resistencia a las enfermedades del frijol más comunes en la Costa Central. (**Resistance to the more common diseases of beans in the central coastal region of Peru.**)
*Inf. mens. Estac. exp. agric. La Molina*, 1956, **30**(347): 25-8.

Resistance to the fungus *Erysiphe polygoni* and to the nematode *Heterodera marioni* is compared for 62 South American varieties of bean.

1474. D'Amato, F.
Modificazione del potere antimitotico del seme di pisello in seguito ad invecchiamento. (**Modification of antimitotic capacity in pea seeds as a result of senescence.**)
*Nuovo G. bot. ital.*, 1953, **60**: 689-90, bibl. 5 [received 1957].

In 1951 pea seeds harvested the previous year showed 98% germination and little mitotic irregularity in the radicle tip of seedlings, but those harvested in 1946 showed only 75% germination and 5–6 times as frequent mitotic irregularities. By 1953 germination capacity of the 1946 seeds had fallen to 58% and seedlings were stunted and deformed. Mitosis in pea radicles and onion root tips was disturbed by extracts from pea seeds, indicating that the testa and embryo each contained a different antimitotic substance, that in the testa being inactivated with age, and that these substances acted synergistically. No water-soluble mutagenic substances were found in old pea seeds.

1475. Soldatenkov, S. V., and Mazurova, T. A.
**The formation of organic acids in germinating legume seeds.** [Russian, with English summary ¾ p.]
*Biohimija*, 1956, **21**: 573-6, bibl. 10.

The organic acid contents of haricot bean, broad bean and pea seeds were 1·93, 0·90 and 0·82% of air dried material respectively. About one half of the total acids consisted of citric acid, the others being malic, acetic and some unidentified acids. Upon germination the acid content increased significantly and in 14-day-old seedlings the amount of total acids in bean was 4 times as high, in broad bean twice and in pea 9 times as high as in the seeds. The content of citric acid was reduced in the seedlings while that of malic acid greatly increased, in the case of pea 53 times. The organic acid content of legumes is compared with that of cereals.—Leningrad St. Univ.

1476. Highkin, H. R.
**Vernalization in peas.**
*Plant Physiol.*, 1956, **31**: 399-403, bibl. 10.

Soaked seeds of the 2 late varieties Unica and Zelka were stratified at 4° or 7° C. for periods up to 30 days and then kept under normal growing conditions either

immediately or after 10 days of devernalizing treatment (30° C. and 16 hr. artificial light daily). In both varieties vernalization affected vegetative development as well as flowering. In Unica the effect on vegetative growth was partly, and that on flowering completely reversed by devernalizing. The same trend was apparent, but less distinct, in Zelka. Pre-vernalization treatment at 20° C. for 3 days rendered the seeds insensitive to vernalization in respect of flowering. At 26° C. they remained vernalizable for only 1 day. In neither case did the pretreatment inhibit the vegetative effect of vernalization.—Calif. Inst. Technol., Pasadena.

1477. Ueki, K.
**The varietal differences in the flowering and fruiting response of broad bean to changes in night temperature. I. Differences in sensibility to night temperature in some early and late varieties.** [Japanese, with English summary ½ p.]
*Tech. Bull. Kagawa agric. Coll.*, 1955, **7**: 1-5, bibl. 24.

It was found that the date when flowering started, the length of the flowering period, the number of flowers, the time and duration of the fruiting period, the percentage of pods set, the weight of seed and the rate of growth of pods were influenced by night temperature. The effects varied with variety. An early variety was more sensitive to the effects of night temperature before flowering, whereas a late variety responded to temperature treatment after flowering.

J.R.L.

1478. Inoue, Y., and Suzuki, Y.
**Studies on the reproductive physiology of common beans, *Phaseolus vulgaris*. VI. The effects of light intensity on the reproduction of common beans.** [Japanese, with English summary ¾ p.]
*J. hort. Ass. Japan*, 1956, **25**: 152-6, bibl. 16, illus.

In experiments with Masterpiece beans, reduction in light intensity reduced the assimilation capacity of the plants. At less than 30% natural light growth was markedly checked. As light intensity was reduced the number of latent flowerbuds increased and the number of flowers decreased; there was also greater flower drop and poorer pod set. Reduction in light intensity had almost no effect on pollen activity. [For parts I–V see *H.A.*, 25: 569, 1696, 1697, and 26: 606, 2788.]

1479. Iijima, T.
**On the physiology and utilization of vitamin $B_1$ in garden crops. VII. The effects of foliage thiamine sprays on the chemical composition and taste of some garden crops.** [Japanese, with English summary ¼ p.]
*J. hort. Ass. Japan*, 1956, **25**: 194-8, bibl. 17.

The test crops were Masterpiece beans, potatoes and sweet potatoes. Thiamine sprays slightly increased the sugar, starch and thiamine contents of the bean seeds. They increased the carbohydrate content and C/N ratio of stems, leaves and roots. It is considered that these results explain the fact that the treatment promoted root development and flowerbud differentiation and shortened the growing period. [For part VI see *H.A.*, 26: 3260.]

1480. Sorensen, L. O.
**Effects of maleic hydrazide on photosynthesis and respiration of red kidney bean.**
*Diss. Abstr.*, 1956, **16**: 1569, being *Publ.* 17,367 of 41 pp.

Red kidney beans were grown in the greenhouse in nutrient solutions to which MH at the rate of 100 p.p.m was added. Photosynthesis was initially stimulated by MH, but after reaching a peak within about 3 days the rate steadily declined until the leaf abscissed or the plant died. The trend in respiration was similar to that of photosynthesis but its peak was higher and was reached after about 4 days.—Univ. Nebraska.

1481. Jenkins, H. V., Carter, O. G., and Crofts, F. C.
**Garden peas successfully sod-seeded.**
*J. Aust. Inst. agric. Sci.*, 1956, **22**: 207-8, bibl. 1, illus.

A satisfactory crop of garden peas was grown without seed bed preparation in a paspalum pasture on a red basaltic soil near Lismore, N.S.W. The advantages of sod-seeding are elimination of the risk of erosion, no costly seedbed preparation and the full grazing of the paddock before seeding and immediately after harvest. The practice is only possible where the grass pasture is dormant and the rainfall adequate.—Univ. Sydney, N.S.W. J.R.L.

1482. Ahmadi, A. A.
**Blossom abscission in dry beans (*Phaseolus vulgaris*, var. Red Kidney).**
*Diss. Abstr.*, 1956, **16**: 983, being *Publ.* 15,580 of 61 pp.

Field and greenhouse studies were carried out on blossom abscission, and on plant response to environment, irrigation, fertilization and growth regulators. In 1953 field applications of 20 lb. ammonium nitrate per acre significantly increased bean yields, but no response to N side-dressing in the field was apparent in 1954. Plants under high irrigation gave a 20% higher yield than those under low irrigation. Some parthenocarpy was induced by the 3 growth substances used but the percentage pod set was not affected. Greenhouse studies showed that the optimum temperature for pollen germination was 15° C., and the critical temperature 30° C. At 90° F. [32·2° C.] blossoms dropped from intact plants, but not at 70° F. [21·1° C.]. Anatomical studies showed that abscissed flowers were not fertilized. It is concluded that blossom abscission of dry beans under adverse conditions may be due to the inability of the pollen grains to germinate.—Cornell Univ.

1483. Smith, C. B.
**Phosphorus limiting fertilizer element in snap bean production.**
*Science for the Farmer*, 1956, **4**(2): 15.

In 3 factorial fertilizer experiments in Pennsylvania it was found that the yield of Tendergreen snap beans was greatly increased by applications of up to 1,000 lb./acre superphosphate but was actually decreased by applications of 150 lb./acre actual N or K. It is therefore recommended, in that area, that an 8–24–8 fertilizer be used for beans and that the necessary amounts of N and K be applied to the other crops in the rotation.

J.R.L.

1454. [illegible], J., and [illegible], H.
**The uptake of iron as ferric sequestrene by *Vicia faba* and *Phaseolus vulgaris*.**
*Physiol. Plant.*, 1956, **9**: 618-23, bibl. 12.

The ability of *Vicia faba* and *Phaseolus vulgaris* to take up iron from solution with and without EDTA was investigated by analysing the exudates which were collected in pipettes after the stems had been cut off. The results indicate that the higher iron content of the exudate in the presence of the chelate compound as compared with an inorganic iron source is mainly attributable to the fact that the inorganic iron tends to be removed from the nutrient solution by precipitation. Within the short limits of uptake considerable difference was found between the two iron sources when the concentrations in the solutions were high enough, a difference not necessarily being in favour of the chelate. [Author's summary.] [illegible]

1455. Kannan, P. H., and Mann, P. J. G.
**Manganese oxidation in the pea plant (*Pisum sativum* L.) grown under conditions of manganese toxicity.**
*Biochem. J.*, 1957, **65**: 175-81, bibl. 19

Pea plants grown in water culture containing toxic concentrations of manganese sulphate accumulate compounds containing manganese of valency greater than two in the stems. It is suggested that under these conditions of manganese supply the rate of oxidation of Mn++ ions may exceed the rate of reduction by higher-valency forms of manganese by plant metabolites, thus leading to the observed accumulation of manganese in higher oxidation states. In other plants examined for similar conditions the accumulation of "higher-valency forms of manganese" could not be demonstrated, probably owing to the fact that in these plants they are reduced as fast as they are formed. It is suggested that the function of manganese as an essential element in plant nutrition depends, to some extent, on its valency change. [From authors' summary.]—[illegible]

1456. [illegible], M. V., and [illegible], A. I.
**Control of leafminers on bean seeds by seminar means.** [In Russian.]
*Zhurnal vsesoyuz. khim. obshch. Mend.*, 1956, **21** (2): 16-21, bibl. 5

Experiments conducted in the Krasnodar region in 1951 and 1954 showed that summer sowing of bean seeds infected with *Acanthomyia phaseoli* greatly reduced disease incidence and increased yields compared with sowing at the normal time in the spring. The most suitable time for sowing was found to be the last half of June. Sowing in late June gave further reductions of plant incidence but also caused yield reductions. Seed of the summer-sown crop, sown in the spring, produced plants with a low disease incidence giving high yields.

1457. [illegible], P. E.
[Investigations about the working out of measures against the pea weevil (*Bruchus pisorum* L.).] [illegible] Investigations concerning the control measures against the pea weevil (*Bruchus pisorum* L.). Studies on the effect of chemical means (hexachlorethane) against overwintering stages of various cultivated plants.]
*Phytopath. Z.*, 1956, **27**: 419-[illegible], bibl. 2

Seed treatment with chloranil, hexachlorethane (CSBH) gave very satisfactory protection against several seed- and soil-borne fungus diseases. The test plants included peas and beans, which were grown in greenhouse conditions in a normal compost mixture. Soil treatment with CSBH was less effective. The action of CSBH appears to be systemic.—Farmer-Fabrieken Bayer, Leverkusen.

1458. [illegible], P., and [illegible], M. H.
[Further test attempting to control pea weevil (*Bruchus pisorum* L.) by experiments on the combination of pea seed.] [English summary 15 lines.]
*Nachr. Pflanzenk.*, 1957, **10**: 713-20.

However much the germination percentage of peas varied from test to test in two years' laboratory and field trials, seed treatment with captan (50% or 75%, applied at the rate of 4 g./kg. seed) greatly improved the results. Sowing in steam-sterilized soil was also found to raise the germination percentage, but an examination showed that this was not due to the destruction of pathogenic soil organisms.

1459. Guzmán M., E., and Richardson, R. W., Jr.
Control de la pudrición de la semilla y raíz del chícharo en el Valle de Toluca. (**Control of seed and root rot of peas in the Toluca Valley.**)
*Agric. téc. Mexico*, 1955, **15**: 35-4, illus.

Experiments on the control of seed and root rot caused mainly by an undetermined *Fusarium* species, involved 9 varieties and seed treatment with 4 fungicides. Alaska and Premium Gem were the most resistant varieties. Orthocide was the most effective fungicide, followed by arasan.

1460. [illegible], R. D., de Cervin M., A., and [illegible], J. I.
Antracnosis del frijol. (**Bean anthracnose.**)
*Agric. téc. Mexico*, 1955, **15**(2): 12-14, 46, illus.

Experiments showed that bean anthracnose (*Colletotrichum lindemuthianum*) will not survive on plants grown from infected seed during the winter. In during the dry season, seed produced under low rainfall conditions, with furrow irrigation, will therefore be free from anthracnose.

1461. Gonzalez B., J. E., and Ramos S., P.
Comparación de insecticidas contra los insectos que atacan al frijol.—Año 1955. (**Comparison of insecticides for control of insects attacking beans. 1955.**)
[In Spanish. Engl. sum. 12 lines.]
*Lima*, 1956, **30** (346): 18-29.

Detailed results are given of comparative trials with 9 insecticides for control of *Empoasca* species and *Liriomyza* species on beans. The best results were given by endrin, lindane, DDT and parathion. Toxaphene and methyl bromide were satisfactory, but less economical. Isodrin was not satisfactory, and both chlordane and heptachlor reduced yield. [For earlier work see *H.A.* **26**: 420.]

1492. Franssen, C. J. H.
**De levenswijze en de bestrijding van de bonekever (*Acanthoscelides obtectus* Say). (Biology and control of the common bean weevil.)** [English summary ¾ p.]
*Meded. Dir. Tuinb.*, 1956, **19**: 797-809, bibl. 7, illus.

All life stages of the weevil are killed at a temperature of 40° C. below zero. It is recommended that all shipments of imported beans should be examined, and that weevils in infested beans should be killed by fumigation or low temperature treatment.—Inst. PlZiekt. Onderz., Wageningen.

1493. Kawamura, S., Suzuki, H., and Matsumoto, T.
**The relation of maturity to the composition of broad bean seeds. II. The carbohydrates.** [Japanese summary ½ p.]
*Tech. Bull. Kagawa agric. Coll.*, 1955, **7**: 81-6, bibl. 19.

Broad bean seed samples were collected every 5 days from April 21 to June 16 and were analysed for reducing and non-reducing sugars, starch and amylose. The sugars (% dry weight) decreased as the crop matured but the starch and amylose increased. There was very little increase in weight of carbohydrates per seed after 1 June. The authors note that there was a large amount (28·7% on 6 May) of an undetermined component in the seed, the amount decreasing with maturity. J.R.L.

1494. Mitchell, R. S., and Lynch, L. J.
**Measuring quality in green peas.**
*Food Pres. Quart.*, 1956, **16**: 42-6, bibl. 4.

Details are given of the best method found of sampling canning pea crops for testing with the maturometer [*H.A.*, 21: 3586 and 24: 1586] and the tenderometer to assess the optimum time for picking. Comparisons have shown that the 2 instruments measure different physical qualities, but both are a valid measurement of quality, since they provide a high correlation with each other and with the alcohol-insoluble solids content of the peas. A regression equation has been worked out to estimate the tenderizing effect of viner speed; the yield at various viner speeds is also discussed. Experiments have shown that a well-designed size-grader would probably provide a more efficient means of quality separation than the gravity separator now commonly used.—C.S.I.R.O., Homebush, N.S.W. J.R.L.

1495. (Toole, E. H., Toole, V. K., and Borthwick, H. A.)
**Bean storage and yielding ability.**
*Agric. Res., Wash.*, 1956, **5**(6): 12.

Seed of dwarf beans was stored for 4 years in good conditions (a naturally dry warehouse), or in unsatisfactory conditions (66° F. and r.h. 57%). Well-stored seed germinated quickly, and used up all the reserves in the cotyledons which were shed within 10 to 14 days. Poorly-stored seed used only about ¼ of the reserves before cotyledon drop; the plants continued to grow slowly and matured late, and total pod weight was reduced by 27–30%.

## *Mushrooms.*

(*See also* 1585r, 1586k.)

1496. Stoller, B. B.
**Phoracide for controlling the Phorid gnat.**
*M.G.A. Bull.*, 1957, No. 85, pp. 6-11, illus.

A fly trap for sampling the incidence of phorids is described. Although numerous insecticides have proved unavailing against them quick success is claimed for a new proprietary insecticide called Phoracide discovered by investigators of the U.S. Dept. of Health. The active ingredient of this substance, at present only available in small amounts, is a phosphate poison. It is only $\frac{1}{10}$ as toxic to man as parathion but is more toxic than malathion.

## *Okra.*

1497. Kuwada, H.
**Studies on differences in the physiological and ecological characteristics of an artificially raised amphidiploid in comparison with those of its parents. XVI. The effect of artificial media on pollen germination.** [Japanese, with English summary ¼ p.]
*Tech. Bull. Kagawa agric. Coll.*, 1956, **7**: 186-9, bibl. 2.

Comparisons were made between the germination on artificial media of pollen of okra, *Abelmoschus* [*Hibiscus*] *esculentus*, *A. manihot* and an amphidiploid hybrid between the two, *A. glutino-textilis*. The response of the pollen of the hybrid was similar to that of *A. esculentus*, and both were more adaptable than *A. manihot*. For the latter the best medium contained 7% agar-agar and 20% glucose, but the germination percentage only exceeded 90% when stylar tissue from any of the 3 species was added to the medium.

1498. Kuwada, H.
**Studies on differences in the physiological and ecological characteristics of an artificially raised amphidiploid in comparison with those of its parents. XVII. The effect of different temperatures on seed germination.** [Japanese, with English summary ¼ p.]
*Tech. Bull. Kagawa agric. Coll.*, 1956, **7**: 190-2, bibl. 3.

Seeds of *Abelmoschus* [*Hibiscus*] *esculentus*, *A. manihot* and of an amphidiploid hybrid between them, *A. glutino-textilis*, were subjected to high temperatures ranging from 40° to 80° C. and to low temperatures ranging from 3° to −10° C. for periods of 0·5 to 24 hours. The ill-effects on germination of very high or very low temperatures were most marked in *A. manihot* and least in *A. esculentus*. With the latter the time taken by seeds to germinate was little affected by temperature or the duration of treatment, but with *A. manihot* the time taken to germinate increased and the percentage germination declined with treatments of relatively long duration exceeding 50° C. With *A. glutino-textilis* only temperature treatments exceeding 60° C. adversely affected rate and percentage of germination.

### *Onions and allied crops.*

(*See also* 1048, 1406-8, 1429, 1585a.)

1499. Ito, K.
**Studies on the bolting of onion. I. Relation between flower bud formation and bulb division.** [Japanese, with English summary ½ p.]
*J. hort. Ass. Japan*, 1956, **25**: 187-93, bibl. 4.

When nutritional conditions were the same, bolting occurred more frequently as the leaf stage advanced, but when nutritional conditions were poor bolting occurred at an earlier leaf stage than when they were good. There was considerable variation in the leaf stage at which bulb division occurred, but the lowest leaf stage for bulb division appeared to be a varietal characteristic. Poor nutritional conditions and low temperature delayed bulb division. The leaf stage at which bolting occurred was 1 leaf earlier than that at which bulb division occurred.

1500. Foley, R. F.
**Some factors affecting the volatile sulfur content of the onion, *Allium cepa* L.**
*Diss. Abstr.*, 1956, **16**: 1323, being *Publ.* 12,367 of 70 pp.

In greenhouse and field experiments the effects of various treatments on the volatile S content of onions was studied. The effect of treatments with different levels of S was significant in the greenhouse, but this effect was not apparent in the field. Nitrogen had no discernible effect, and Chloro IPC had no effect in a 1-year trial. Marked differences were found in the volatile S content both between and within varieties. Treatments with Ca, Mg and K caused statistically significant differences in the flavour of onions. The effect of climate on the flavour of onions was more marked than that of treatment. In a year with many hours of sunlight and solar radiation the volatile S content was much higher than in a duller year.

1501. Vidal Martín, D.
Cultivo del ajo. **(Cultivation of garlic.)**
*Hojas divulg., Madrid* **12-56H**, 1956, pp. 16, illus.

Brief notes are given on 10 varieties and general information on climate, soil, manuring, cultivation, storage and disease and pest control. Spanish production figures are quoted.

1502. Mann, L. K., and Lewis, D. A.
**Rest and dormancy in garlic.**
*Hilgardia*, 1956, **26**: 161-89, bibl. 46, illus.

Sprout emergence of garlic bulbs in the field was most rapid after storage at 5°, 10° or 15° C. according to length of storage: sprouting was generally slowest after storage at 20° C. When cloves were planted in moist sand at temperatures between 5° and 17° C., sprouting was most rapid following a preplanting storage of 5° C.; sprout emergence was slowest after storage at 0° C. and 20° C. Increasing storage time hastened sprout emergence. Root emergence from cloves held in a damp cloth at 5° and 15° C. was earliest after preplanting storage at 5° C., but the greatest weight of roots was produced by cloves after storage at 10° C. Bulbs in a deep state of rest showed highest $CO_2$ production at temperatures at which the rest was broken most rapidly. Bulbs which had reached deep rest before being put in controlled storage had greater $CO_2$ production as the temperature increased.

1503. Freeman, T. E.
**Studies on the control of pink root of shallot.**
*Diss. Abstr.*, 1956, **16**: 1567, being *Publ.* 17,441 of 60 pp.

In laboratory tests 7 fungicides (of which 6 were organic mercury compounds) were found to be toxic to the pink root fungus [*Pyrenochaeta terrestris*] at rates which were practical on a field basis. Mergamma and Mersolite 8 proved phytotoxic in greenhouse and field tests. Six of the fungicides significantly reduced pink root incidence in the field when applied to the opened row as a drench. Semesan, Setrete and Agrox in that order gave very good control of the disease. A 4-year rotation plan was not suitable for the control of pink root disease. Heat treatment of infected shallot sets at temperatures up to 56° C. for 1 hour was injurious to the sets and did not rid them of the fungus.—Louisiana St. Univ.

1504. Lordello, L. G. E.
Sôbre um nematódeo do gênero *Pratylenchus*, parsito das raízes de *Allium cepa*. **(A nematode of the genus *Pratylenchus*, parasitic on the roots of *Allium cepa*.)** [English summary 1 p.]
*Rev. Agric. Piracicaba*, 1956, **31**: 181-8, bibl. 15, illus.

A new subspecies *brasiliensis* of *Pratylenchus coffeae* is described. It seriously damaged onion roots, reducing bulb size to about ⅓ of normal.

1505. Sifuentes, J. A., and Barnes, D.
Control químico del trips de la cebolla. **(Chemical control of onion thrips.)**
*Agric. téc. México*, 1955, **1**(2): 15, 48, illus.

Of 6 insecticides tested, heptachlor and dieldrin gave the best control. These should be used at the rate of 800 g. pure insecticide per ha., either in dust or spray form.

1506. Guyer, G., and Hutson, R.
**The phytotoxicity of insecticide formulations utilized as in-row treatments of onions and radishes.**
*Quart. Bull. Mich. agric. Exp. Stat.*, 1956, **39**: 263-9, bibl. 5.

The granulated formulations included either 2·5% heptachlor or 10% dieldrin with either attaclay or vermiculite as carriers, in various solvents, mostly with deactivators. Application ensured direct contact with the seed. In general the addition of deactivators reduced the danger of toxicity to seedlings and neither these substances nor the carriers had adverse effects. The severity of injury was apparently dependent on the type and quantity of solvent used, deobase and AR-66 being particularly toxic. Vermiculite preparations were safer than attaclay preparations of the same potential toxicity. Onion seedlings were much more sensitive than those of radish to toxic preparations.

1507. Salokangas, K.
Sipulin säilytyksestä. **(Storage experiments with onions.)** [English summary 13 lines.]
*Maatalous ja Koetoim.*, Part 10, 1956, pp. 186-95, illus.

From trials at Tikkurila the following conclusion is reached: storage losses are least in a dry, cold, storage room, av. humidity 40–60% and temperature 2–9° C. Maleic hydrazide spraying has proved effective in preventing sprouting in stored seed onions. [From author's summary.]

### *Root crops.*

(*See also* 1009, 1031, 1084k, 1175, 1425, 1435, 1438, 1506, 1585k, 1586i.)

1508. PRIESTLEY, G.
**A new carrot variety for the home gardener.**
*N.Z. J. Agric.*, 1956, **93**: 489-90, illus.

The new carrot, Sweetcrop, is a selection from the field variety Holmes Improved. It is small and of deeper colour than the type. It appears to be resistant to aphid attacks and has an excellent flavour. Although intended primarily as a maincrop carrot, in 2 trials it produced higher yields of both early and maincrop roots than Chantenay Red Core or Manchester Table. J.R.L.

1509. KUMAKI, Y.
**Vernalization experiment on carrots.** [Japanese, with English summary 8 lines.]
*J. hort. Ass. Japan*, 1956, **25**: 163-6, bibl. 11.

Vernalization of carrot seed, by cold storage at 2–3° C. for 1, 2 or 3 months, had a clear effect on flowerbud differentiation and bolting, although the 3 varieties tested (Kokubu, Kintoki and Gosun) differed in their response.

1510. WATANABE, S., ASANO, H., AND MAEDA, T.
**On the germination of Kintoki carrot seeds. I. Delayed germination.** [Japanese, with English summary 8 lines.]
*Tech. Bull. Kagawa agric. Coll.*, 1955, **7**: 27-30, bibl. 11.

Kintoki carrot seeds normally have a low germination rate. Experiments have shown that delayed germination is more pronounced if the seeds are immature. Seeds are normally harvested in July but show a better germination rate if gathered in September. J.R.L.

1511. AKI, S., AND WATANABE, S.
**Studies on the storage of the seeds of Kintoki carrot. I. Influence of storage temperature and seed moisture on germination.** [Japanese, with English summary 10 lines.]
*Tech. Bull. Kagawa agric. Coll.*, 1955, **7**: 31-5, bibl. 19.

No improvement in the germination of Kintoki carrot seeds was obtained by storing for 10 days at 30–40° C. with the moisture content below 13%. Stored seeds with higher moisture content showed even poorer germination than untreated seeds. Those with a moisture content of more than 13·5% and stored at 45° C. failed to germinate, but seeds with less than 9% moisture stored at 50° C. showed 40–50% germination. It is concluded that moisture in stored seeds has a greater influence on germination than has the temperature at which they are stored. J.R.L.

1512. PACI, P.
Ricerche sulla biologia fiorale della carota. **(Studies on the floral biology of the carrot.)** [English summary 9 lines.]
*Riv. Ortoflorofruttic. ital.*, 1956, **40**: 414-23, bibl. 62, illus.

In the 4 carrot varieties studied there was no evidence of self pollination without insect vectors. Parthenocarpic fruits were not viable. These varieties were self- and cross-compatible among themselves and with wild carrots. Plants intended for breeding should be protected from the pollen of wild or undesirable varieties.—Centro Miglior. Piante ortofruttic. C.N.R., Ist. Coltiv., Arb., Univ. Florence.

1513. VERMA, B. S.
**A note on the effect of different types of seeds raised in-situ and by transplanting on the growth and yield of radish.**
*Indian J. Hort.*, 1956, **13**: 105-6, bibl. 3.

In the "cat-tail" radish, germination and growth of tops and roots were higher when the seed was taken from transplanted seed plants than when the seed plants were grown *in situ*. Flower production was earlier and seed yields were higher with plants grown from the seed of plants sown *in situ*.—Hortic. Res. Stat., Krishnagar.

1514. DODSON, A., AND OTHERS.
**Occurrence of a bitter principle in carrots.**
*Science*, 1956, **124**: 984-5, bibl. 7.

Chromatographic analyses were made of extracts from bitter carrots [see *H.A.*, 25: 2921]. A compound considered to be the bitter principle was found, for which an empirical formula of $C_{15}H_{15}O_5$ was suggested. Other properties of the compound are noted.—Mich. St. Univ., East Lansing.

1515. SAYRE, C. B.
**"Bitter" carrots.**
*Amer. Veg. Gr*, 1956, **4**(11): 16, illus.

Forty strains and varieties of carrots showed no immunity to the development of a bitter flavour after cold storage [see *H.A.*, 25: 2921]. Studies have shown that climate or soils during growing periods, age or environmental conditions during the last 8 weeks in the field may have some relation to the development of the bitterness.—New York Exp. Stat., Geneva.

1516. COOKE, G. W.
**The value of rock phosphates for direct application.**
*Emp. J. exp. Agric.*, 1956, **24**: 295-306, bibl. 8.

For swedes and turnips Gafsa rock phosphate was nearly as effective as superphosphate on soils with pH values below 6·5. On neutral or alkaline soils, however, rock phosphates were almost useless. In pot experiments Morocco phosphate was equivalent to superphosphate for radish, about half as effective for swedes and of little use for lettuce and certain field crops. In tests with radish on rock phosphates from various countries, Gafsa phosphate proved the best.—Rothamsted exp. Stat.

1517. ROBERTS, E. T.
**Control of *Stemphylium radicinum* on carrot seeds.**
*Plant Path.*, 1956, **5**: 122, bibl. 2.

Hot water treatment (25 min. at 122° F.) virtually eliminated *Stemphylium radicinum* infection on carrot seed. In the laboratory the treatment reduced the germination percentage from 50 to 22, but under commercial conditions of sowing treated seed gave a satis-

factory, though slightly delayed, germination performance. Hot water treatment at 125° F. for 30 min. reduced germination percentage excessively.—N.A.A.S., Reading.

1518. Palm, E. T., and McNew, G. L.
**A method for determining the incidence of clubroot infection in nutrient cultures.**
*Contr. Boyce Thompson Inst.*, 1956, **18**: 333-7, bibl. 6.

In order to distinguish between the effects of soil treatments on the initiation of infection and the overgrowth response of crucifers to *Plasmodiophora brassicae*, a simple, reliable method was developed for inducing infection in sand culture and measuring its incidence. Any increase or decrease in available calcium from 2 mg. eq. per litre caused a sharp decrease in infection [in turnips]. This suggests that one of the major effects of liming soils is to increase calcium supplies beyond the optimum for infection. [From authors' summary.]

1519. Wilson, J. D.
**Nematode control in Ohio soils.**
*Market Grs' J.*, 1956, **85**(10): 14-15, illus.

The northern root-knot nematode has been shown to be most common in muck soils and to cause the greatest loss in carrot crops. Experiments have shown that applications of EDB and D–D are best made in the autumn [see also *H.A.*, 27: 407]. The fumigants may be broadcast or applied as row, band or spot treatments. Some distributors that can be constructed around ploughs and cultivators are described.Ohio agric. Exp. Stat., Wooster. J.R.L.

1520. Carlson, E. C.
**Lygus bug injury and control on carrot seed in Northern California.**
*J. econ. Ent.*, 1956, **49**: 689-96, bibl. 21, illus.

Two seasons of investigations with *Lygus hesperus* on Red Core Chantenay carrot seed indicated that during each season there were 2 generations of this bug on the crop. It was found that the bugs cause a blasting or prevent the development of carrot seeds, especially during the flowering period, and that they primarily cause embryoless seed after petal fall. The extent of damage showed the need for insecticidal control when the bug count reaches one per two seed heads. Treatment should begin early in the flowering period of the second stage of seed heads, at which time an economically injurious bug population is beginning to develop. In experiments 10% DDT dust applied to the second, third and fourth stages of seed heads resulted in the most effective control with a significant increase in seed yield, larger seeds and higher rate of germination. The predators *Nabis* sp. and *Geocoris* sp. were affected by the 3 DDT applications to the same extent as the bugs, but the red spider predator, *Orius* sp., was fairly tolerant to DDT, and no red spider population build up occurred on the treated carrot seed crop.—Univ. Calif., Davis.

1521. Stone, L. E. W.
**Control of carrot fly on carrots and parsnips.**
*Plant Path.*, 1956, **5**: 141-3, bibl. 3.

Almost complete protection from first generation *Psila rosae* on carrots, with no reduction in germination, was given by seed treatment with *gamma*-BHC, aldrin or dieldrin at 1 oz. per lb. seed. Second generation fly, however, was not controlled by 50% *gamma*-BHC at 1–6 oz. per lb. Seed dressing with a preparation containing 75% *gamma*-BHC and 10% thiram gave good commercial control at 1 oz. per lb. and even better control at 2 oz. On parsnips seed dressing with *gamma*-BHC at 1 or 2 oz. per lb. gave successful control of first generation *Psila rosae*, but spraying with 0·1% dieldrin was less effective. Against the second generation fly dieldrin sprays were only successful where adequate spray cover of the crowns was possible.—N.A.A.S., Bristol.

1522. Občinnikova, L. M.
**Control of carrot fly.** [Russian.]
*Sad i Ogorod*, 1956, No. 11, pp. 35-6.

In the Moscow region the damage caused by *Psila rosae* to carrots was reduced by sowing on irrigated plots at the beginning of June and on unirrigated ones in the autumn or early spring. The use of repellents and treatments with DDT and BHC, at sowing or of the growing crop, were either ineffective or resulted in tainting, but 7% BHC applied at 50 kg. per ha. to the soil in the spring following an infested crop gave complete control of the fly.

1523. Jørgensen, J.
Den store kålflue (*Chortophila floralis* Fall). Nyere undersøgelser vedrørende dens biologi, parasitering og bekaempelse. (**The turnip root fly in Denmark. Recent studies on its biology, parasites and control.**) [English summary 4 pp.]
*Tidsskr. Planteavl*, 1957, **60**: 657-712, bibl. 23, illus.

*Chortophila floralis*, though causing very severe damage to swedes in Denmark, is of minor importance as a pest of turnip, cabbage and horse radish. Trials on the control of the fly have been in progress since 1952 without yielding satisfactory results up to date.

### *Salad crops.*

(*See also* 1017, 1424, 1425, 1585w, z.)

1524. Secrett, F. A.
**Lettuce for the modern market.**
*Agriculture, Lond.*, 1957, **63**: 476-9, illus.

The author speaks from his own practical experience on the production of winter, spring and summer lettuce in England. Winter lettuce has decreased in popularity. The chief winter varieties grown today are Imperial and Winter Crop. Advice is given on growing spring lettuce under lights, frames, cloches and in the glasshouse. The author notes that *Botrytis* is the chief danger to both winter and spring lettuce; proper handling and care should obviate it. Finally he discusses the growth of the summer crop in the open.

1525. Finch, C. G.
**Summer lettuce varieties.**
*Agriculture, Lond.*, 1957, **63**: 527-9, bibl. 1, illus.

In continuation of the work by Watts [*H.A.*, 25: 4004] on the classification of summer lettuce varieties, cropping trials on the various groups commonly grown in Britain were started at the N.I.A.B., Cambridge, in 1954. Notes are given on the preliminary results

obtained with 7 groups in the All the Year Round class, 3 in the White Boston class and 6 in the Curly Crisp class.

1526. Vlček, F., Toul, V., and Pospíšilová, J.
Obsah L-askorbové kyseliny v rychleném salátě. (**The L-ascorbic acid content of forced lettuce.**) [English, Russian and German summaries ½ p. each.]
*Sborn. čsl. Akad. zeměd. Věd, Rostl. Výroba*, 1956, **29**: 795-808, bibl. 27.

In a 2-year study of forced lettuce it was found that the average L-ascorbic acid content of hothouse plants was 13·1 mg. % and that of frame-grown plants 11·5 mg. % as against 14·4 mg. % for field-grown plants. The outer leaves of hothouse plants contained 8·8–15·5 mg. % vitamin C and the heart 26·9–28·7 mg. %. Comparative figures for frame-grown plants were 7·4 and 18·9 mg. %. Foliar applications of 4 fertilizer solutions affected neither yield nor vitamin C content. Forcing varieties grown outdoors without glass had a higher vitamin C content than those covered with Helios glass; yields were about equal.

1527. Skinner, C. G., and others.
**Stimulation of seed germination by 6-(substituted)thiopurines.**
*Arch. Biochem. Biophys.*, 1956, **65**: 567-9, bibl. 7.

The effects of various 6-(substituted)thiopurines on germination of lettuce seed were determined by soaking the seed in aqueous solutions of the purine derivatives for 8 hours and then germinating them on filter paper soaked in a solution of the pure purine derivative in a dark room at 30° C. The pentyl, hexyl, benzyl, 2-phenylethyl, and 3-phenylpropyl derivatives were the most effective in stimulating germination. It appears that these active derivatives, as well as certain amino analogues, may substitute for the light requirement in promoting germination of dormant lettuce seed. On a control basis, near quantitative germination was obtained after 72 hr. in the dark with the more active compounds, which compares with less than 10% germination, after as many as 6 days, of seeds soaked in water alone.—Clayton Foundation for Res., biochem. Inst. and Dep. Chem., Univ. Texas, Austin.

1528. Grogan, R. G., and Zink, F. W.
**Fertilizer injury to lettuce.**
*Calif. Agric.*, 1956, **10**(12): 5, 12, 16, illus.

A disorder of lettuce, which has caused considerable loss in California, is characterized by wilting, root injury and sometimes death of plants. In greenhouse and field studies these symptoms have been reproduced by the application of toxic concentrations of fertilizers and animal manures. The most injurious compounds were those containing ammonium hydroxide and free ammonia; materials containing nitrates, nitric acid or phosphoric acid were also apt to be toxic, whereas ammonium sulphate, ammonium nitrate and calcium nitrate were relatively safe.

1529. Zink, F. W., Grogan, R. G., and Welch, J. E.
**The effect of the percentage of seed transmission upon subsequent spread of lettuce mosaic virus.**
*Phytopathology*, 1956, **46**: 662-4, bibl. 2.

Reduction of the percentage of infected seed increased control of the disease to an extent dependent on vector activity. Only where seed transmission was below 0·1% was the degree of control satisfactory.—Univ. Calif., Davis.

1530. Strong, R. G.
**Control of the six-spotted leafhopper, *Macrosteles fascifrons* (Stahl), a vector of lettuce-yellows virus.**
*Diss. Abstr.*, 1956, **16**: 1745, being *Publ.* 18,289 of 131 pp.

Insecticide evaluations were carried out by caging small areas of lettuce and infesting them with viruliferous leafhoppers. Based on the time required to obtain a 90% kill of the leafhoppers, the 4 insecticides tested were ranked in the order: malathion, parathion, Systox and DDT.—Cornell Univ.

1531. Enochian, R. V., and Smith, F. J.
**House packing western lettuce.**
*Calif. Agric.*, 1956, **10**(11): 3, 12, 14, illus.

In 1952 only 20% of the lettuce harvested in the Salinas district of California was field-packed in cartons and then vacuum-cooled. The remainder was packed in wooden crates in packing houses with layers of crushed ice placed between the lettuces. In 1955 89% of the crop was field-packed. The present paper gives a short account of a detailed economic study of packing-house operations, the full report of which will be published by the Giannini Foundation of Agricultural Economics.

1532. Ministry of Agriculture, London.
**Watercress cultivation.**
*Bull. Minist. Agric. Lond.* **136**, 2nd edition 1956, pp. 28, illus., 2s. 6d.

The general information on watercress production is based on that of the previous edition [see *H.A.*, 18: 485], but it has been revised and brought up to date, and the bulletin now includes information from growers in different parts of the country. There are also new sections on raising crops from seed and on diseases of watercress.

1533. Tomlinson, J. A.
**Control of watercress crook root disease by zinc-fritted glass.**
*Nature*, 1956, **178**: 1301-2, bibl. 4.

In laboratory trials crook root disease of watercress, caused by a water-borne fungus (probably a species of *Spongospora*), was completely controlled by the addition to the water of small amounts of zinc sulphate. In subsequent field tests the application of 1 lb. zinc-fritted glass per square yard gave promising control of the disease in experimental and commercial watercress beds.—Nat. Veg. Res. Stat., Wellesbourne.

1534. (Parmentier, G.)
Remarques sur une affection nouvelle du cresson. (**Remarks on a new disease of watercress.**)
*Parasitica*, 1956, **12**: 138.

The triploid brown variety of watercress has been attacked in the Dyle Valley, Belgium, by a species of *Spongospora* to which the diploid green variety is resistant. Besides the obvious direct attempts to control the fungus, liming before planting checks the proliferation of water snails, which may be agents of transmission.

### *Spinach.*

(*See also* 1009, 1022, 1084e, y, 1425.)

1535. McLean, D. M., and Jones, H.A.
**Production of Early Hybrid 7 spinach seed—a spinach resistant to downy mildew and cucumber mosaic.**
*Stats. Circ. Wash. St. agric. Exp. Stats* **291**, 1956, pp. 11, illus.

Information is given on the following aspects of Early Hybrid 7 spinach seed production in western areas of Washington and Oregon: General plant characteristics, roguing male plants, ratio of pollen rows to seed rows, spacing plants, cultural practices including the use of herbicides, and seed harvesting.

1536. Nakamura, E.
**Vernalization of spinach. (I). Interaction between vernalization and day length.** [Japanese, with English summary ½ p.]
*J. hort. Ass. Japan*, 1956, **25**: 167-72, bibl. 6.

Vernalization of spinach seed at 1±1° C. for 10–40 days promoted seed stalk elongation in proportion to the duration of the treatment. Under natural long-day conditions, however, plants from non-vernalized seed flowered and fruited at the same time as those from vernalized seed. When seed was vernalized for 0, 15 or 30 days, germinated under short-day conditions, and after expansion of the third leaf exposed to long (17 hr.) days, the elongation of the seed stalk was proportionate to the duration of the long-day treatment and/or vernalization.

1537. Kagawa, A.
**Studies on floral induction in slow-bolting varieties of spinach. I. Effect of chemical vernalization and low temperature treatments of seeds.** [Japanese, with English summary ⅓ p.]
*J. hort. Ass. Japan*, 1956, **25**: 173-80, bibl. 34, illus.

Spinach seed of 4 varieties was vernalized at 3±1° C. for 2 weeks, with or without treatment with 1 p.p.m. NAA for 24 hours. The seeds were sown in spring, summer or autumn. In all cases time of initiation of flower primordia and time of flowering were markedly accelerated by both treatments. Plants from treated seed differed from the controls in their photoperiodic responses.

1538. Cavazza, L.
L'influenza di basse tensioni dell'acqua sulla germinazione di alcuni semi. **(The effect of low moisture tension on the germination of certain seeds.)**
*Nuovo G. bot. ital.*, 1953, **60**: 759-62, bibl. 9 [received 1957].

Spinach germination was highest in percentage and speed at the greatest tension applied, i.e. 50 cm., and the rate of increase of germination of spinach seed was highest between 5 and 20 cm.

1539. de Vilmorin, R.
Variations de la teneur en fer de quelques variétés d'épinards. **(Variations in iron content in different spinach varieties.)**
*C.R. Acad. Agric. Fr.*, 1956, **42**: 722-4.

Analytical work carried out under Mme Bilquez at the chemical laboratory at Verrières on three spinach varieties shows that there is considerable variation in iron content, not only between different varieties, but also between members of the same variety. This fact suggests the possibility of obtaining by breeding a spinach variety with a particularly high iron content. Work on this is now on progress.

1540. Zimmerman, L. J.
**Manganese and plant acidity interaction in the growth of plants in water culture.**
*Diss. Abstr.*, 1956, **16**: 1037-8, being *Publ.* 16,502 of 122 pp.

Three test plants, which included spinach, were grown in water cultures with low, medium and high concentrations of Mn. After harvesting the plants were analysed. Acid contents were slightly increased at lower temperatures and shorter photoperiods. The differences induced by N source were greater, plants grown with nitrate N containing more acid than those grown with ammonium N. The Mn content of the shoot increased as the Mn concentration in the substrate increased, the rate of increase being greater in plant roots with higher acid content. Iron content decreased with increasing Mn content. The maximum growth of tops occurred at an Fe : Mn ratio approaching unity; for root growth the optimum ratio was between 3 and 4. Manganese deficiency symptoms appeared first and were more severe in plants of lowest acidity. Plants with highest acidity tolerated a wider range of Mn concentrations. Spinach grown with 25 p.p.m. Mn made good growth when the acid content was greatest. The plant roots with the greatest amount of acids contained the highest amount of Mn. It is concluded that organic acids help to maintain an optimum level of Mn activity in the plant so that adequate enzyme activity and maximum growth can occur.—Purdue Univ.

### *Tomatoes, capsicums and eggplants.*

(*See also* 1043, 1051, 1056, 1060, 1065, 1087, 1204, 1295, 1409, 1424, 1426, 1429, 1431, 1440, 1585h, l, p, x, 1586d, g, 1593, 1710, 1719, 1996.)

1541. Singh, H. B., and Bhagchandani, P. M.
**Pusa Ruby is the new tomato with fine points.**
*Indian Fmg*, 1956, **6**(7): 28-9, illus.

Pusa Ruby was selected at the Indian Agricultural Research Institute, New Delhi, from a cross between Improved Meeruti and Sioux. High early yield, good fruit colour and keeping quality, greater resistance to virus diseases and tolerance of adverse weather conditions are its main characteristics.

1542. Goodman, O.
**Breeding tomatoes to resist blight.**
*Grower*, 1957, **47**: 179-83, bibl. 5, illus.

Forty-three commercial varieties including some from Canada, Norway and Sweden were tested for their resistance to *Phytophthora infestans* by inoculation with race 4. Only one variety, Atom, showed a good degree of resistance. In addition 3 lines of *Lycopersicum pimpinellifolium* and a line of *L. esculentum* subspecies *cerasiforme* showed a high degree of resistance to the fungus. In preliminary field trials with the progeny of some of the resistant varieties and lines, an F1 hybrid of Devon Surprise×Atom has shown

obtained with 7 groups in the All the Year Round class 3 in the White Boston class and 6 in the C class.

1526. Vlček, F., Toul, V., and P
Obsah L-askorbové kyseliny salátě. **(The L-ascorbic acid cor lettuce.)** [English, Russian summaries ½ p. each.]
*Sborn. čsl. Akad. zeměd. Věd, R* 1956, **29**: 795-808, bibl. 27.

In a 2-year study of forced lettuce it the average L-ascorbic acid content of was 13·1 mg. % and that of fram 11·5 mg. % as against 14·4 mg. % plants. The outer leaves of hothouse p 8·8–15·5 mg. % vitamin C and the h mg. %. Comparative figures for frame were 7·4 and 18·9 mg. %. Foliar a 4 fertilizer solutions affected neither yiel C content. Forcing varieties grown outc glass had a higher vitamin C content than t with Helios glass; yields were about equal.

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**Fertilizer injury to lettuce.**
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A disorder of lettuce, which has caused considerat loss in California, is characterized by wilting, ro injury and sometimes death of plants. In greenhou and field studies these symptoms have been reproduce by the application of toxic concentrations of fertilizer and animal manures. The most injurious compounds were those containing ammonium hydroxide and free ammonia; materials containing nitrates, nitric acid or phosphoric acid were also apt to be toxic, whereas ammonium sulphate, ammonium nitrate and calcium nitrate were relatively safe.

1529. Zink, F. W., Grogan, R. G., and Welch, J. E.
**The effect of the percentage of seed transmission upon subsequent spread of lettuce mosaic virus.**
*Phytopathology*, 1956, **46**: 662-4, bibl. 2.



promise of resistance.—Johnstown Castle agric. Coll., Wexford, Ireland.

1543. Day, P. R., Jenkins, J. E. E., and Wilcox, H. J.
**A search for resistance to *Didymella lycopersici* in the tomato.**
*Plant Path.*, 1956, **5**: 150-1, bibl. 1.

Screening tests revealed that none of the 40 lines of wild species tested was resistant to wound-inoculation. It is therefore considered unlikely that the apparent resistance to soil inoculation shown by certain lines would be of any practical use in a tomato breeding programme.—John Innes hort. Instn, Bayfordbury, and N.A.A.S., Cheshunt and Cambridge.

1544. Dereškevičus, K.
**The use of colchicine in tomato breeding.**
[Russian.]
*Bot. Žurnal*, 1956, **41**: 1482-6, illus.

Colchicine treatment of the tomato variety Fillbasket resulted in some tetraploid forms which were of no direct economic interest. A diploid progeny of a colchicine treated plant, No. 6, however, gave higher yields of earlier maturing, larger fruits than the original. A disadvantage was ribbed fruit.—Lithuanian agric. Acad.

1545. Yagyu, P. K.
**The effects of X-rays and thermal neutrons on dormant seeds of tomato.**
*Diss. Abstr.*, 1956, **16**: 1042-3, being *Publ.* 16,568 of 68 pp.

When the dosages of radiations were increased there was a corresponding decrease in growth of seedlings from irradiated seeds. Chlorophyll and morphological abnormalities were observed in the immediate generation as well as in the next generation. Thermal neutron radiation was less damaging to the tomato plants and gave a greater number of genetical changes than did X-rays.—Univ. Minnesota.

1546. Palmer, T. P.
**Tricotyly in the tomato.**
*Nature*, 1957, **179**: 272, bibl. 1.

Plants of Harbinger, which all originated from one selfed fruit, showed no significant variation from truss to truss in the number of seeds producing tricotyledo nous seedlings. These results are contrary to thos obtained by G. Haskell with Clucas-99 [see *H.A* 24: 1621].—D.S.I.R., Christchurch, New Zealand.

1547. McKeen, C. D.
**The inhibitory activity of extract of *Capsicum frutescens* on plant virus infections.**
*Canad. J. Bot.*, 1956, **34**: 891-903, bibl. 15.

The expressed juice from *Capsicum frutescens* contains a substance [probably a protein] that mark decreases the formation of local and primary le by certain viruses on cowpea and *Chenopo hybridum* L. and to a lesser extent on *Nicotiana tal* vars. Harrow Velvet and Samsun, and *Physalis viana* L. The extent to which pepper juice dec the numbers of lesions is independent of the concerned and depends only on the species to inoculations are made. Pepper juice inhibits t of local lesions when it is applied v the upper and lower leaf

a; but if applied to S. H., and Teubner, F. G.
culation, pepper ju**ces for increasing the fruit crop**
production of lesion**se-grown tomatoes.**
ect of the inhibitive *Mich. agric. Exp. Stat.*, 1956,
her than increase c, illus.
the pepper extract 5 varieties showed that earlier and
of virus inoculation er clusters formed and plants were
cowpea and *Chenop*dlings at the cotyledon stage were
on of lesions on cow ks at 50°–55° F. (night temperature)
the same degree of i continuously at 60°–70° F. The
*H.A.*, 18: 482], this ed to the first two clusters [see also
cucumber. [From a ut spraying with 200 p.p.m. N-m-
nada Dep. Agric., O id very markedly increased flower
luster if practised at critical times.

KAWA, M., and ONO, lling and spraying on yield were
**ffect of the sun's rays** ons are given on method and times
**ggplant as affecting** rtilizer recommendations are also
nese, with English su
*Kanagawa agric. Exp.*
, No. 4, pp. 79-82, bibl.

**ed that seeds from egg time of reproductive structure**
**ed with black cellophnd their relation to yield of**
**eds from fruits cover es.**
minated a little better 1956, **16**: 1035, being *Publ.*
with yellow bags bett
the seeds from uncove g behaviour of Rutgers tomatoes

SHUSSES, L.-A., and D 4 years 1952–1955. The number
rocédé pour hâter la mat day increased from 3–4 per plant
pleine terre. (**A metho** 30 in late August. Of the buds
**ening of tomatoes in the** 83% in 1952 and 52% in 1955
*ev. hort. suisse*, 1956, 29 d-August. About 14% of the
mato varieties Marmand- July matured fruit by September
ization produced ripe fr fruit before frost. About 95%
Vernalization treatme tured by the end of September
–20° [C.] from time of so which were visible at or before
ed by 30–40 days at 12° e significantly correlated with
ment followed. development even as early as
ractical single measurement for
gers tomatoes is to count num-

Calvert, A. the season.—Rutgers Univ.
**Effect of the early envir**
**ment of flowering in the t** ND Samorodova-Bianki,
**ture.**
*J. hort. Sci.*, 1957, **32**: **otenoids and the fertiliza-**
ring a period beginning at **naecea of different ages in**
ding approximately 9 days **plants.** [Russian.]
n be vernalized. The num *auk S.S.S.R.*, 1956, **109**:
florescence is minimized w s.
naximized with high temper logical analyses have shown
ay and night temperatures tent of the gynaecea of 2
letermines the degree of the hest on the 6th day after the
possible that a high day tem h-green buds, and that con-
a low night temperature and nation and fertilization were
tions of leaf or flower num t date.
perature treatments are
completion of the vernaliz
becomes sensitive for the nu **in tomato fruit. I.**
inflorescence. This period **lene evolution to fruit**
fifteenth day after cotyled **ing.**
perature increases and high *Physiol.*, 1956, **34**:
number of flowers. At
60° F. the variety Poter und to possess a climacteric
weekly intervals for the nu duction which was accom-
3 inflorescences; under the ethylene. When the fruit
are somewhat longer fo g and evolution of ethylene
summary.]—John Innes ho rtion to the increase in
bon dioxide and ethylene
3823.]

evolution occurred not only when the fruit ripened, but also afterwards, during senescence. On the other hand, young, green fruit possessed a pronounced peak in carbon dioxide evolution without changes in colour or texture or evolution of significant amounts of ethylene. Thus a series of waves in carbon dioxide production occurred as the tomato developed, ripened, and aged. Waves in ethylene evolution accompanied the carbon dioxide once the ripening process began. Evolution of large amounts of ethylene appeared to be associated with changes in the metabolic pathway that occurred with ripening, rather than being an accompaniment for increased respiration at any stage in the development of the fruit. [Author's abstract.]—Univ. Alberta, Edmonton.

1555. Anon.
**(Grafting of eggplants.)**
Het enten van aubergines.
*Meded. Proefst. Groent. Fruit. Glas Naaldwijk*, November 1956, p. 5.

When eggplants were grafted on tomato roots growth was better than that of ungrafted plants, and no wilting was observed. Grafted plants produced twice as many fruits as ungrafted plants, and quality was also better.

1556. Kryžanovskij, F. D.
**Grafting eggplant on tomato.** [Russian.]
*Priroda*, 1956, **45**(12): 98-100, illus.

In experiments near Moscow eggplants grafted on tomato were more vigorous, matured 12–15 days earlier and produced up to 10–12 times higher yields than the controls grown on their own roots. The fruit of the grafted plants was also larger and often seedless and a few grafts were sterile. Of the eggplant varieties used Simferopol appeared to respond most markedly to grafting, but the most suitable tomato rootstock variety has yet to be ascertained.

1557. Ratner, E. I.
**The effect of nitrogen on the development of plants and the action of growth stimulators in relation to conditions of mineral nutrition.** [Russian.]
*Trud. Inst. Fiziol. Rast. Timiryazeva*, 1954, **8**(2): 100-133, bibl. 42, illus.

The effect of N on the generative development of plants appears to depend as much on external conditions as on the plant itself. Tomato yield increases due to an increased rate of N application were greater when plants were grown in full light than when shaded. Increased rates of N did not always result in increased yields. Spraying tomato flowers with 2,4-D at 10 mg./l. increased yields, but the percentage increase varied with rates and dates of N application. Treatment with 2,4-D also hastened maturity, but the percentage increase of ripe fruits again depended on N nutrition.

1558. Malcolm, J. L.
**Nitrogen experiments with potatoes and tomatoes on marl soils.**
*Proc. Soil Sci. Soc. Fla, 1955*, **15**: 91-100, bibl. 4.

A 7-year experiment has shown that the yield from tomato plants grown on a marl soil was increased by the application of nitrogenous fertilizers. The maxi-

mum yield was obtained with 160 lb./acre of nitrogen, and cyanamid, sulphate of ammonia, ammonium nitrate, urea or tankage were all found to be equally effective. Leaf analyses showed that the nitrogen occurring in the soil was not available until the soil had dried out at the end of the season, and it was concluded that heavy applications of nitrogenous fertilizers were essential to the production of tomatoes on the deep poorly drained marl soil.—Sub.-trop. Exp. Stat., Homestead, Fla.

J.R.L.

1559. YUAN, T.
**Exchange studies of $P^{32}$ and $P^{31}$ in plants.**
*Diss. Abstr.*, 1956, **16**: 835, being *Publ.* 14,508 of 92 pp.

Tomato plants were grown in gravel-sand cultures, and different ratios and concentrations of $P^{32}$ and $P^{31}$ were added to the mineral nutrient solutions. Tissue analyses 2 weeks later indicated that an isotopic exchange between $P^{32}$ and $P^{31}$ took place within the plant. $P^{32}$ exchanged with $P^{31}$ in inorganic and in complex organic forms. The amount of phosphorus previously accumulated may have affected the amounts of $P^{32}$ and $P^{31}$ absorption but had no effect on their ratio. The content of previously-accumulated $P^{31}$ in a particular tissue had a definite effect on the amounts of $P^{32}$ and $P^{31}$ and the ratio of these which later accumulated in the tissue. During treatment the ratios of accumulated $P^{32}$ and $P^{31}$ varied widely with type of tissue, although total uptake from the nutrient solution had the same ratio as that in the nutrient solution.—Ohio St. Univ.

1560. POSSINGHAM, J. V.
**The effect of mineral nutrition on the content of free amino acids and amides in tomato plants. I. A comparison of the effects of deficiencies of copper, zinc, manganese, iron, and molybdenum.**
*Aust. J. biol. Sci.*, 1956, **9**: 539-51, bibl. 35.

All the deficiencies investigated except that of Mo brought about increases in the free amino acid fraction. In every case there was a change in the quantitative composition of this fraction. Fe and Zn deficiencies were associated with large increases in the free levels of the two amides asparagine and glutamine, while with Cu and Mn deficiencies many individual amino acids increased in concentration, but not the two amides. The level of total free amino acids and amides was low in Mo-deficient plants. The qualitative differences between deficient- and full-culture plants were not large, but included the accumulation of $\beta$-alanine with deficiency of Zn, Cu or Mo, and of pipecolinic acid with deficiency of Mn or Fe. Other differences were the absence of histidine with Cu, Mn, Fe and Mo deficiency, of phenylalanine with Cu deficiency, and of lysine with Cu, Mn and Mo deficiencies. Additionally many quantitative changes in amino acid concentration were found. The significance of these results is discussed in relation to the known interactions between the mineral nutrition and the amino acid composition of plants. Although a characteristic spectrum of free amino acids is associated with each individual deficiency, the differences are not considered sufficiently large to make analysis for these compounds an additional method for the diagnosis of mineral deficiencies in this plant. [From author's summary.] —Div. Pl. Ind., C.S.I.R.O., Canberra.

1561. LUTRICK, M. C.
**Effects of certain environmental factors on toxicity of manganese in tomato plants grown on steamed soils.**
*Diss. Abstr.*, 1956, **16**: 1311, being *Publ.* 17,391, of 77 pp.

The phytotoxic effects of steamed soil on tomato plants were studied under different conditions in the greenhouse. Leaf symptoms of Mn toxicity in tomato were identical with those of sterilization injury. Sterilization injury became more severe with an increase in exchangeable soil Mn after steaming. The level of exchangeable Mn present in the soil after steam treatment was positively correlated with the total Mn content of the soil. Leaf symptoms of Mn toxicity were masked under low light intensity, although the Mn content of the plant was equal to that found in injured plants grown under normal light intensity. Increased soil temperature increased the rate of plant growth, decreased the severity of injury, and decreased the plant Mn content by dry-matter dilution. Soil applications of phosphates helped to reduce sterilization injury. Increased soil pH resulted in decreased exchangeable soil Mn and plant Mn. There was a significant interaction between soil temperature and soil pH.

1562. WINFREE, J. P.
**Effects of manganese nutrition of higher plants on growth, iron-porphyrin enzymes, oxalacetic acid decarboxylation, indole acetic acid inactivation and ascorbic acid content.**
*Diss. Abstr.*, 1956, **16**: 1311-12, being *Publ.* 16,697 of 82 pp.

It was shown that the Mn nutrition of sand-grown Rutgers tomatoes was reflected in the ascorbic acid content of the ripe fruits. It is considered that Fe-Mn relationships may be the controlling factors in ascorbic acid metabolism.

1563. NISHITA, H., KOWALEWSKY, B. W., AND LARSON, K. H.
**Influence of soil organic matter on mineral uptake by tomato plants.**
*Soil Sci.*, 1956, **82**: 401-7, bibl. 2.

Tomato seedlings in general showed the greatest dry matter production and highest uptake of $Sr^{90}$ and Ca when 2 g. of dry plant material was added per 100 g. of loam soil. Higher quantities up to 10 g. markedly checked growth, particularly with the first batch of seedlings. Uptake of Mg was highest at the 5 g. level and that of Na and K increased with rising organic-matter concentration, while Mn uptake was independent of both concentration and time of incubation of organic matter. Uptake of $Sr^{90}$ was not significantly affected by increased soil volume due to organic additions or by whether the radioactive material was added to the original soil or to the organic matter.—Univ. Calif., Los Angeles.

1564. MCNAUGHT, K. J., AND HOUSTON, B. J.
**Excess soluble salts in glasshouse tomato soils.**
*N.Z. J. Sci. Tech., Sect. A*, 1956, **38**: 449-65, bibl. 23.

A detailed soil-water study, started in 1952, was designed to assess the reliability of available rapid methods of determining the presence of excess soluble salts in glasshouse tomato soils. The results show, among other things, that for tomatoes the critical conductivity of the saturation extract is about 6·4 millimhos per cm. at soil moisture tensions approaching 1 atmosphere and about 7·5 millimhos per cm. at a tension of one-third atmosphere. The fertilizers mainly responsible for trouble from excess soluble salts are potassic and nitrogenous compounds, and not superphosphate, as has been commonly assumed.—Rukuhia Soil Res. Stat., Hamilton.

1565. Holmes, R. M.
**Effect of soil conditioners on crops and soils.**
*Diss. Abstr.*, 1956, **16**: 1307-8, being *Publ.* 16,679 of 123 pp.

The value of several soil conditioners for improving structure of the sandy vegetable soils of New Jersey was studied. The most effective soil conditioners were those with a long chain length and cation imparting a degree of hydrophobicity to the chemical. Under intense cultivation the longevity of soil conditioners was markedly reduced. Conditioners which were slightly hydrophobic had the greatest longevity, and by their action allowed better utilization of available water reserves during drought. Conditioners did not greatly affect nutrient uptake by the plants and at ordinary levels of application were not harmful to plant roots. S-17 in nutrient solution decreased the water requirement of tomatoes.

1566. Leone, I. A., Brennan, E., and Daines, R. H.
**Atmospheric fluoride: its uptake and distribution in tomato and corn plants.**
*Plant Physiol.*, 1956, **31**: 329-33, bibl. 13.

Fluorine accumulation in leaves was greater and injury more severe when tomato plants were fumigated with the same quantity of hydrogen fluoride for a short period at high concentration than for longer periods at lower concentrations. In the long-period treatment more fluorine was accumulated by mature than by young leaves and all leaves afterwards lost some fluorine by diffusion or even more by washing. Retention was greater after short-period treatment.—Rutgers Univ., New Brunswick, New Jersey.

1567. Jones, J. P.
**Studies on the auxin levels of healthy and virus infected plants.**
*Diss. Abstr.*, 1956, **16**: 1567-8, being *Publ.* 17,362 of 68 pp.

Auxin levels were determined and compared in healthy and virus-diseased tobacco and tomato plants. The method of auxin determination is described. In 3 out of 6 experiments with tobacco plants the auxin levels in plants infected with tomato spotted wilt were significantly higher than in healthy plants. There was an indication of seasonal variation in the auxin level of healthy tobacco plants. In all experiments with tomatoes the auxin contents of plants infected with spotted wilt were higher than in healthy plants. In 1 of 2 experiments comparing healthy tomato plants to those infected with tobacco mosaic virus there was a highly significant increase in auxin level in diseased plants.—Univ. Nebraska.

1568. Kramer, M.
**A possibilidade de contrôle das doenças de virus do tomateiro por inseticida sistêmico. (The possibility of controlling virus diseases of tomato by systemic insecticide.)**
*Biológico*, 1956, **22**: 177-81, bibl. 8, illus.

The systemic insecticide 3911 (activated carbon containing 50% of 0,0 diethyl (S-ethylmercaptomethyl) dithiophosphate) was applied to tomato seed at 1 kg. per 50 kg. of seed, and to the soil in the planting-out furrows at 1,875 g. per ha. plus sufficient talc to facilitate even distribution. From 3 observations made at 10-day intervals it was clear that the treatment markedly checked virus infection.

1569. Davis, D., and Dimond, A. E.
**Site of disease resistance induced by plant-growth regulators in tomato.**
*Phytopathology*, 1956, **46**: 551-2, bibl. 9.

Foliage applications of 2,4-dichlorophenoxyacetic acid, α-naphthaleneacetic acid, or 3-indoleacetic acid reduced the severity of Fusarium wilt of tomato when treatment preceded inoculation. The plant-growth regulators induced resistance in the shoots in the presence of roots as well as in the absence of roots. [Authors' summary.]—Conn. agric. Exp. Stat., New Haven.

1570. Harrison, D. E.
**Fungicides effective in the control of early blight (target spot) of tomatoes.**
*J. Agric. Vict.*, 1956, **54**: 659-64, bibl. 3, illus.

Zineb, maneb and 2 copper fungicides were compared in a trial with Grosse Lisse for control of early blight (*Alternaria solani*). All treatments reduced leaf and fruit infection. Bordeaux- and zineb-treated plots had significantly higher yields than control plots.

1571. Jacks, H., and Webb, A. J.
**A note on fungicide screening for control of tomato leaf-mould.**
*N.Z. J. Sci. Tech., Sect. A*, 1956, **38**: 342-4, bibl. 2.

Of 17 fungicides tested in the glasshouse for control of *Cladosporium fulvum* dichlone, zineb, captan, salicylanilide, and chloranil proved the most effective. [Authors' summary.]—Plant Dis. Div., D.S.I.R., Auckland.

1572. Coe, D. M., and Conover, R. A.
**B-622 as a control for gray leaf spot of tomato.**
*Plant Dis. Reptr*, 1956, **40**: 1084-6, bibl. 1.

In limited trials at two places in Florida B-622 (2,4-dichloro-6-(O-chloroanilino)-S-Triazine) gave outstanding control of *Stemphylium solani*. No phytotoxicity was observed. [From authors' summary].—Indian River Field Lab., Fort Pierce, Fla, and Fla sub-trop. Exp. Stat., Homestead.

1573. Neofitova, V. K.
***Sclerotinia libertiana* on tomatoes.** [Russian.]
*Sad i Ogorod*, 1956, No. 10, pp. 29-30, illus.

For the control of *Sclerotinia libertiana* attacking glasshouse tomatoes in the Murmansk region the removal of infected plants with a clump of soil and general

glasshouse hygiene are recommended. Acid soils favour the development of the mycelia and an application of 30 g. of lime per plant was found to reduce disease incidence. To prevent soil acidification mineral fertilizers should be neutralized with lime.

1574. Hare, W. W.
**Comparative resistance of seven pepper varieties to five root-knot nematodes.**
*Phytopathology*, 1956, **46**: 669-72, bibl. 7, illus.

Early California Wonder, Oakview Wonder and 4795B Peru were susceptible to *Meloidogyne incognita acrita* and *M. incognita*. Early California Wonder was moderately resistant to *M. javanica* and susceptible to *M. arenaria*, whereas Oakview Wonder and 4795B Peru were resistant to both species. Red Chili and P.I. 135824 were moderately resistant to *M. incognita acrita* and *M. incognita* and resistant to *M. javanica* and *M. arenaria*. *Santanka* xS and 405B Mexico were resistant to all species except *M. hapla*. All varieties were susceptible to *M. hapla*. [From author's summary.]—Miss. St. Coll.

1575. Houssny, H. H., and Oteifa, B. A.
**Preliminary field tests for evaluating some tomato varieties for resistance to root-knot nematodes, *Meloidogyne* spp.**
*Plant Dis. Reptr*, 1956, **40**: 974-6, bibl. 3.

In the Giza area only 4 species of root-knot nematode were present, among which *Meloidogyne javanica* was predominant. The variety Pearl Harbor showed a high degree of resistance to all 4 species. The Urbana and Illinois T 19 varieties were fairly susceptible to *M. javanica* and *M. hapla* but quite tolerant to *M. incognita* var. *acrita*.—Cairo Univ., Giza.

1576. Lear, B., and Thomason, I. J.
**Control by soil fumigation of root-knot nematodes affecting fresh fruit and canning tomatoes in California.**
*Plant Dis. Reptr*, 1956, **40**: 981-6, bibl. 1.

Results of experiments made over 3 years indicate that row-placement applications of D-D, EDB and Nemagon are comparable to broadcast applications for control of *Meloidogyne incognita* var. *acrita* and *M. javanica*. Nemagon applied broadcast at 0·75 gal. p. acre or along the rows (5 ft. apart) at 0·3 gal. p. acre resulted in excellent nematode control and high yields. Doubling the rate of application in some cases depressed yields and adversely affected root growth. Vapam, applied by chisel, plough or disk, was ineffective; in one experiment, however, application by overhead sprinkler gave good nematode control.—Univ. Calif., Davis and Riverside. [See also *H.A.*, 26: 2618.]

1577. Smith, W. A., and Saunders, G. W.
**Tomato mite control.**
*Qd J. agric. Sci.*, 1956, **13**: 63-5, bibl. 9.

Experiments in the Bowen district of Queensland, supported by observations on commercial holdings, have shown that sulphur or parathion schedules will control the tomato mite, *Vasates lycopersici*. Sulphur is recommended for use on tomatoes and parathion, which will also control tetranychid mites, for tobacco.
J.R.L.

1578. Johnson, B.
**The influence on aphids of the glandular hairs on tomato plants.**
*Plant Path.*, 1956, **5**: 131-3, bibl. 8, illus.

The stems, petioles and upper leaf surfaces of tomato plants bear a large number of glandular hairs. When these are broken they exude a fluid which adheres to the legs of aphids passing through it and hardens on them. When this happens the aphids may find it impossible to cling to the plant and so fall off, they may become stuck to the plant and die, or they may become so clogged with the exudate that they are unable to take off. The implications of this are briefly discussed.—Waite agric. Res. Inst., Univ. Adelaide.

1579. Collins, W. E.
**On the biology and control of *Drosophila* on tomatoes for processing.**
*J. econ. Ent.*, 1956, **49**: 607-10, bibl. 11.

It was found that of the *Drosophila* spp. present in the field during harvesting and at the canning factory *D. melanogaster* was the most abundant. In tests with pyrethrum and allethrin formulations, DDT and lindane applied by a Dyna-fog machine for the control of the flies on truckloads of tomatoes, 2% lindane was the most effective. Of 7 treatments used for *Drosophila* control in the field TDE was the best, giving the lowest number of eggs and maggots in the processed juice.—N.J. agric. Exp. Stat., New Brunswick.

1580. Mason, H. C.
**Tests with bait sprays for the control of *Drosophila*.**
*J. econ. Ent.*, 1956, **49**: 708-9, bibl. 2, illus.

In cheesecloth cages over tomato plants bait sprays containing heptachlor, aldrin or Bayer O 13/59 were promising, but additional work is necessary to determine their value for *Drosophila* control under commercial conditions.—Agric. Res. Serv., Beltsville, Md.

1581. Avidov, Z.
**Bionomics of the tobacco white fly *(Bemisia tabaci* Gennad.) in Israel.**
*Ktavim*, 1956, **7**: 25-41, bibl. 7.

The life history of *Bemisia tabaci*, a pest of vegetables in Israel, has been studied. Infestation of tomato seed-beds was practically eliminated by applying a sawdust mulch, which raised the surface temperature above that (46° C.) lethal to the adults. Seedling growth was also improved by the mulch. About 50 botanical species are known hosts of the fly, solanaceous and cucurbitaceous vegetables being most favoured. A parasitic wasp has been found, but it is relatively ineffective in checking the increase of the pest.—Agric. Res. Stat., Rehovot.

1582. Wilcox, J., Howland, A. F., and Campbell, R. E.
**Investigations of the tomato fruitworm, its seasonal history and methods of control.**
*Tech. Bull. U.S. Dep. Agric.* **1147**, 1956, pp. 47, bibl. 33, illus.

Studies of the biology and control of the tomato fruitworm (*Heliothis zea*) were carried out from 1936 to 1952, chiefly in California but also in Utah and Ohio. The larvae feed on or in the fruit and may cause

serious losses. In the early tests cryolite and calcium arsenate gave the most effective control. Tests in 1944–50 showed DDT to be superior to cryolite, and TDE and toxaphene to be nearly as good as DDT. Removing infested tomatoes from the field at picking time reduced subsequent infestation. Ploughing old tomato fields and nearby sweet corn fields destroyed many pupae. J.R.L.

583. Banerjee, S. N., and Basu, A. N.
**Evaluation of insecticides against the brinjal shoot and fruit borer in India.**
*FAO Plant Prot. Bull.*, 1956, **5**: 7-8, bibl. 2, illus.
As a result of 6 field experiments (details of which are to be published later) the authors recommend two applications of 0·08% endrin emulsion during the pre-fruiting stage to control the brinjal shoot and fruit borer (*Leucinodes orbonalis*). Applications of 0·5 and 1·0% DDT also gave satisfactory control but were more expensive, while DDT at lower concentrations was less effective.—W. Bengal St. agric. Res. Inst., Calcutta. J.R.L.

584. Lorenzen, C.
**Tomato harvester.**
*Amer. Veg. Gr*, 1956, **4**(10): 20, illus.
A pear-shaped strain of tomato is being used in studies on mechanical harvesting of tomatoes at the University of California. Cutting the root system and lifting the vine can be done with the experimental machine, but the separation of fruit from the vine is still being studied.

*Noted.*

585.

a Aida, H.
**Studies on the so-called "foreign" seed production of early onions, No. 2. The selection of mother onion bulbs in a warm place at a low altitude for seed production on a high plateau.** [Japanese, with English summary 5 lines.]
*Bull. Kanagawa agric. Exp. Stat. hort. Sect.*, 1956, No. 4, pp. 65-71, bibl. 9, illus.

b Anon.
**Now . . . mechanical bean harvesters.**
*Amer. Veg. Gr*, 1956, **4**(10): 11, illus.
Three types are illustrated and described.

c Banga, O. (Editor).
9e beschrijvende rassenlijst voor groentegewassen [inclusief vroege aardappel, aardbei, tabak, geneeskrachtige en aromatische kruiden]. **(Ninth descriptive variety list of vegetable crops [including early potatoes, strawberries, tobacco, medicinal and aromatic herbs].)**
[*Publ.*] *Inst. Vered. Tuinbouwgew. Wageningen*, 1957, pp. 164, illus., fl. 1.75.

d Barnes, W. C., and Epps, W. M.
**Powdery mildew resistance in South Carolina cucumbers.**
*Plant Dis. Reptr*, 1956, **40**: 1093, bibl. 1.

e Becker, G.
Problematik der Qualitätszüchtung. **(The problems of breeding for quality.)**
*Landw. Forsch.*, 1956, **8**(Sonderheft), pp. 25-42, bibl. 32, illus.
With reference to vegetables [see also *H.A.*, 27: 982].

f Böhm, O., and Schmidt, T.
Die wichtigsten Schädlinge und Krankheiten im Gemüsebau und ihre Bekämpfung. **(The more important pests and diseases of vegetables and their control.)**
[*Publ.*] *Bundesanst. PflSchutz, Wien*, 1955, pp. 73, 31 colour plates, from review in *Z. PflKrankh.*, 1956, **63**: 646.

g Bohn, G. W., and Whitaker, T. W.
**Muskmelon best sellers.**
*Seed World*, 1956, **79**(9): 10, 12.
The relative importance of musk melon varieties grown in different regions of the U.S.A.

h Bovey, R.
Une nouvelle maladie à virus de la tomate en Suisse romande. **(A new virus disease of tomatoes in French-speaking Switzerland.)**
[German, English and Italian summaries ⅓–1 p.]
*Landw. Jb. Schweiz*, 1956, **5**: 599-611, bibl. 37, illus.
Symptomatically similar to the big bud and stolbur diseases.

i Buck, P. A.
**Origin and taxonomy of broccoli.**
*Econ. Bot.*, 1956, **10**: 250-3, bibl. 19, illus.

j Crocomo, O. J., and Salibe, A. A.
Conteúdo em cálcio, proteina e vitamina C em doze variedades de couve (*Brassica oleracea*). II. **(Calcium, protein and vitamin C contents in twelve varieties of cabbage (*Brassica oleracea*). II.)** [English summary 5 lines.]
*Rev. Agric. Piracicaba*, 1956, **31**: 189-206, bibl. 23.
Protein content was similar in all the varieties studied. Vitamin C ranged from 147·302 to 227·395 mg. per 100 g. (For part I see *H.A.*, 27: 576h.)

k Glasser, R. F.
**Evidence of the presence of a toxic metabolite of aldrin in carrot plant material.**
*Diss. Abstr.*, 1956, **16**: 869-70, being *Publ.* 15,995 of 80 pp.
Evidence that aldrin is partially converted to dieldrin in carrot tissue or soil.

l Hafen, L.
**Tomato production in plastic houses.**
*Market Grs' J.*, 1956, **85**(10): 16-17, illus.
Experience with 3 crops at Purdue Univ., Ind.

m Hitchborn, J. H.
**The effect of temperature on infection with strains of cucumber mosaic virus.**
*Ann. appl. Biol.*, 1956, **44**: 590-8, bibl. 8, illus.

n HORGAS, D., AND BRISKI, B.
Doprinos poznavanju prehrambene vrijednosti graha. (**Studies on beans.**) [German summary 1 p.]
*Bilj. Proizv.*, 1956, **9**: 175-201, bibl. 44.
Results are given of the physical and chemical analyses of the seed of 9 Yugoslavian bean varieties.

o JONES, F. G. W., AND MORIARTY, F.
**Further observations on the effects of peas, beans and vetch upon soil population levels of pea root eelworm, *Heterodera göttingiana* Liebscher.** [German summary ¼ p.]
*Nematologica*, 1956, **1**: 268-73, bibl. 1.
Beans and vetch appeared to be less efficient hosts of pea root nematodes than peas.

p JONES, J. R. D.
**Capsicums are increasing in popularity.**
*J. Agric. Vict.*, 1956, **54**: 563-4, illus.
Brief recommendations for cultivation.

q KAWAMURA, S., TUBOI, Y., AND HUZII, T.
**Studies on legume starches. I. Microscopic observation on the granules of starches from some Japanese legumes.** [Japanese summary ½ p.]
*Tech. Bull. Kagawa agric. Coll.*, 1955, **7**: 87-91, bibl. 20, illus.
Including broad bean and various *Phaseolus* spp.

r KINDT, V.
Über den Champignonanbau in der Sowjetunion. (**Mushroom growing in the Soviet Union.**)
*Dtsch. Gartenb.*, 1956, **3**: 325-6, bibl. 2.

s LARSON, R. H., WALKER, J. C., AND POUND, G. S.
**YR Charleston Wakefield, a new yellows-resistant cabbage variety.**
*Phytopathology*, 1956, **46**: 623-4, bibl. 2, illus.

t LOWE, A. D.
**Recommendations for the control of insect pests on brassica crops in New Zealand.**
*N.Z. J. Agric.*, 1956, **93**: 341-53, bibl. 6, illus.
Springtails, aphids, weevils and caterpillars by lindane or DDT dusts and sprays.

u MERCHANT, C. H.
**The vegetable areas of America. Maine.**
*Amer. Veg. Gr*, 1956, **4**(11): 10-11, 17, illus.
Crops grown include lettuces, peas, beans and cucumbers.

v VAN MIDDELEM, C. H., WILSON, J. W., AND HANSON, W. D.
**Sampling studies related to insecticide residues on cabbage and celery.**
*J. econ. Ent.*, 1956, **49**: 612-15, bibl. 5.
Sprayed with parathion.

w MILES, M.
**Carrot fly as a pest of lettuce.**
*Plant Path.*, 1956, **5**: 152, bibl. 2.
See *H.A.*, 26: 1796 and 2865p.

x MOTTIER, P.-P.
Essais comparatifs de précocité de 9 variétés de tomates cultivées en serre. (**Comparative trials on the earliness of 9 tomato varieties grown under glass.**)
*Rev. hort. suisse*, 1957, **30**: 52-3.
Export Wunder was more productive than Best of All and ripened slightly earlier.

y PAL, B. P., SIKKA, S. M., AND SINGH, H. B.
**Improved Pusa vegetables.**
*Indian J. Hort.*, 1956, **13**: 64-73, illus.
A descriptive list of tropical, sub-tropical and temperate vegetable varieties selected as suitable for Indian conditions.

z PEW, W. D., MARLATT, R. B., AND HOPKINS, L.
**Growing head lettuce in Arizona.**
*Bull. Ariz. agric. Exp. Stat.* **278**, 1956, pp. 26, illus.

1586.

a PHILIPP, F.
Ergebnisse der Frühgemüsesortenversuche 1955. Ergebnisse der Sommer- und Spätgemüsesortenversuche 1955. (**The results of trials with early, summer and late vegetable varieties 1955.**)
*Mitt. Klosterneuburg, Ser. B*, 1956, **6**: 123-40, 192-208, 311-332.
For notes on the scheme of vegetable variety trials in Austria see *H.A.*, 21: 511 and 513, and 25: 494.

b PIERPOINT, W. S.
**The phosphatase and metaphosphatase activities of pea extracts.**
*Biochem. J.*, 1957, **65**: 67-76, bibl. 44.

c POIDEVIN, J.
Note sur une culture de haricot de Lima à la station régionale horticole de Fqih ben Salah. (**Note on a Lima bean crop at the Fqih ben Salah regional horticultural station.**)
*Terre maroc.*, 1956, **30**: 360-1, bibl. 2.
Introduction of the varieties Oklahoma and Burpee gave promising results.

d DE RAVEL, G.
La culture de l'aubergine. Culture forcée et de saison. (**Growing eggplants in and out of season.**)
*Rev. hort. Paris*, 1957, **129**: 1585-8, illus.
Varieties, culture, pests and diseases.

e SAUVAGE, G.
Les méfaits de l'hiver. Caprices des gelées. (**Winter injuries. Unpredictable frost action.**)
*Courr. hort.*, 1956, **18**: 385-6.
Onion plants freeze at −3·5° C.; some cabbages are resistant at −10° C.

f SPANGLER, R. L.
**Preparation of cabbage for market.**
*Fmrs' Bull. U.S. Dep. Agric.* **1423**, revised 1956, pp. 18, illus.

g STEVENS, D. M.
**An economic analysis of the production of sweet corn, tomatoes, snap beans and broccoli for processing in New York, 1954 and 1955.**
*Diss. Abstr.*, 1956, **16**: 1308-9, being *Publ.* 17,011 of 333 pp.

h U HUAN-JUAN'.
**The raising of vegetable seedlings in China.** [Russian.]
*Sad i Ogorod*, 1956, No. 12, pp. 16-19.

i WEYDAHL, E.
Gulrot i benk. Med og uten réddik som mellomkultur. (**Carrot cultivation in frames, with and without black radish interplanted.**
*Gartneryrket*, 1956, **46**: 846-7.
Variety and spacing trials in hot and cold frames at Kvithamar.

j WHITAKER, T. W., AND BOHN, G. W.
**Muskmelon varieties for the west . . . south . . . east.**
*Amer. Veg. Gr*, 1956, **4**(9): 10-11, illus.
Six types described.

k WOOD, F. C.
**Diseases of cultivated mushrooms.**
*Nature*, 1957, **179**: 328, bibl. 3.
The "lipstick mould" fungus has now been identified as *Sporendonema purpurescens*.

l YOUNG, P. A.
**A watermelon plant with broccoli type of inflorescences.**
*Plant Dis. Reptr*, 1956, **40**: 1094, illus.
Bunches of numerous green sexless flowers, probably due to a mutation.

## TOBACCO.

### *General.*

(*See also* 1009, 1061, 1411, 1412, 1413f, 1655e, n-p, 1714, 1998, 1999.)

1587. S.E.I.T.A.
*Premier Congrès scientifique international du Tabac, Septembre, 1955.* (**First International Scientific Tobacco Congress, September, 1955.**) [French and English.]
Service d'Exploitation industrielle des Tabacs et des Allumettes, Paris, 1957, $7\frac{1}{2} \times 10\frac{1}{2}$ in., in 2 Vols, pp. LXXX + 803, bibls., illus.

This international congress, described in full detail in these two handsomely produced volumes, was notable for two reasons. In the first place it was the first meeting devoted solely to scientific aspects of tobacco production, whereas at previous international gatherings manufacturing and trade aspects were predominant. Secondly it laid the foundation for the establishment in Paris of the permanent international organization known as CORESTA* (Centre de Cooperation pour les Recherches scientifiques relatives au Tabac). The Congress itself was divided into two parts, the first held in Paris, at which papers were read and discussed, and the second at the Tobacco Research Institute at Bergerac. The papers, which are in French or English, were presented at sessions covering the following subjects: Genetics, Selection, Biochemistry, Pathology and parasitology, and Physiology. Each subject is introduced by a detailed general review. Some of the papers, having been reproduced in various national journals, have already been abstracted or noted [see *H.A.*, 26: 734, 802u, 1850, 1866, 2906, 2907, 2908g, 2908m and 3870, and *H.A.*, 27: 596-598, 612, 616 and 617]. Abstracts of most of the others appear below.

1588. BOURGIN, C.
Une nouvelle méthode scientifique d'enquête et de prévision. Premiers travaux sur son application à la culture du tabac au Maroc. (**A new scientific method of inquiry and forecasting. Preliminary work on its application to tobacco growing in Morocco.**) [English summary $\frac{3}{4}$ p.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 293-309.

In a survey of tobacco production in Morocco, data were collected on sowing, soil preparation, transplanting, harvesting and curing, and on yields and quality grades. Analyses of samples in the laboratory determined the average length and thickness of leaf, average weight of leaves, lightness (weight of 100 sq. cm. of tissue without mid-rib) and content of nicotine in dry matter. The data were assembled and tabulated, making it possible to examine the relationship between any 2 characters and to forecast the possible effects of modifying any one factor or character on the other characters. The hypotheses propounded need to be corroborated experimentally.—Bur. Rech. tech. Régie Tabacs, Maroc.

1589. HUTER, R.
Étude statistique de quelques facteurs de l'amélioration de la production du tabac dans la Broye. (**Statistical study of some factors for improving tobacco production in Broye.**)
*Rev. romande Agric. Vitic.*, 1956, **12**: 116-18.

In this district growers who owned a curing barn obtained higher returns from their crop. In general, when yields were above 30 kg./acre the higher the yield the better the quality.

### *Breeding, selection and varieties.*

(*See also* 1585c, 1599, 1655d.)

1590. CORESTA.
*Catalogue provisoire des Nicotiana.* (**Preliminary list of *Nicotiana*.**) [French and English.]
Centre de Coopération pour les Recherches scientifiques relatives au Tabac, 53 Quai d'Orsay, Paris 7e, 1957, pp. 184.

* Address 53, Quai d'Orsai, Paris 7e.

CORESTA, the international organization established in 1956 for promoting cooperation in research on tobacco, has lost no time in obtaining from its members details of the species and varieties of *Nicotiana*, of which seeds are available for distribution to members of the organization. This first list, though very extensive, is not regarded as by any means complete. It is arranged under the general headings, *Nicotiana tabacum*, *Nicotiana rustica*, Other *Nicotiana* species, Unidentified tobaccos, and Interspecific hybrids. Species and varieties are listed in alphabetic order, and, in so far as it is available, the following information is provided about each of them: Institutes, etc., which possess the type and how and when they obtained it; its origin, both geographical and genetical; its main characteristics; its uses, industrially or for breeding; and general remarks. Finally the contributing Institutes are recorded with lists of the types of *Nicotiana* held by each.

1591. SCHWARTZ, D., FARDY, A., AND CUZIN, J.
Résultats obtenus en sélection par la méthode des caractères liés. **(Results obtained in selection by the method of linked characters.)** [English summary 5 lines.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 325-7, bibl. 6.

A comparison between the progeny of two selections, one rich and the other poor in nicotine, has revealed significant negative correlations between nicotine content and the following plant characters: pigmentation of the stamen filaments, length of style, number of leaves, length of the corolla tube, and flower colour.—S.E.I.T.A.

1592. DEJMONTOVIČ, B. I.
**A *Nicotiana rustica* variety producing few laterals.** [Russian.]
*Agrobiologija*, 1956, No. 4, pp. 123-5, bibl. 3, illus.

An illustrated description is given of the mahorka variety Lohis, which produces high yields of good quality tobacco at wide spacing and needs de-suckering only 3 times instead of the usual 4.

1593. GLAVINIČ, R.
**Vegetative hybridization between tomato and tobacco.** [Russian.]
*Priroda*, 1956, **45**(11): 98-100, bibl. 9, illus.

Reciprocal grafts were made between the tomato variety Želtaja Višnja [Yellow Cherry] and the tobacco variety Plovdivski, which contained 1·20 to 1·40% nicotine/dry matter. The fruits of the tomato on tobacco contained 0·25% to 0·36% nicotine and the leaves 0·54 to 0·85%. In the $F_1$ progeny of the tomato scions some morphological changes were observed and the alkaloid content was lower, but even in the $F_5$ progeny the fruit still contained 0·11 to 0·19% nicotine and the leaves 0·30 to 0·48%. The leaves of the tobacco on tomato did not contain any nicotine, but the leaves of the $F_1$ tobacco progeny contained 0·20 to 0·32% and this increased in successive generations until in the $F_5$ plants 0·60 to 0·78% nicotine was present. To obtain plants free from nicotine grafting should be repeated over several generations, and this is being now done.—Belgrade Univ.

*Sowing and planting.*

1594. ADENI, M. K., AND MURTHY, A.S.
**On the sand beds of Guntur they raise tobacco nurseries.**
*Indian Fmg*, 1956, **6**(6): 43-6, illus.

An account is given of the methods used in raising Virginia and other tobacco seedlings in the coastal sands of Andhra State for distribution to neighbouring black soil areas on which tobacco crops are grown. Seed beds are constructed over a layer of dried tobacco midribs (N 1·2%, $P_2O_5$ 0·61% and $K_2O$ 8·54% in one sample), which are applied at a rate of 5 tons per acre. Four successive sowings of seed are made, the total amount of seed sown per acre being 12 lb. Dried casuarina leaves are spread over the beds 4 days after the first sowing and these are removed after 4 weeks to permit regular weeding. A total of nearly 4 cwt. sulphate of ammonia is applied in several dressings. Watering is done twice a day, but to prevent damping-off the surface of the beds should be dry each evening. Endrin is applied to control the main pest, the caterpillar *Prodenia litura*, and Perenox to control damping-off.—Agric. Coll., Bapatla.

1595. GRAHAM, T. W.
**Weed and root knot control in tobacco plant beds by surface drench and other treatments.**
*Plant Dis. Reptr*, 1956, **40**: 1041-4, bibl. 5.

Surface drench applications with Vapam, Mylone, and N521 used alone and in combination with calcium cyanamid gave effective weed and nematode control in tobacco plant beds during 1955 and 1956 tests. There was no stunting or other adverse effect on tobacco plants at 2 experimental plant bed locations. However, at 1 of 3 locations in cooperative trials with growers in 1956, tobacco plants were retarded following treatment with Vapam and N521. There was no apparent relation to physical conditions of the soil or to cropping history where stunting occurred. Weed control was good at 2 of the 3 grower locations. [Author's summary.]—Agric. Res. Serv., U.S.D.A., and S.C. agric. Exp. Stat., Florence.

1596. ILIEV, P.
**Plant stimulation.** [Russian.]
*Priroda*, 1956, **45**(12): 70-3.

Brief results are given from various Bulgarian research institutes showing the effect of chemical stimulators on a number of crop plants. Soaking tobacco seeds for 8 hours in a solution containing 0·2% potassium bromide + 0·2% diastase and/or watering the seedlings with a 0·05% solution of potassium bromide appreciably increased the yields of both Virginia and Oriental tobacco over those of the controls treated only with water [see also *H.A.*, 25: 710]. Soaking vine cuttings for 15 hours in a 0·2% solution of hydroquinone greatly improved root and shoot growth.

1597. ENDEMANN, W.
Untersuchungen über den Einfluss der Standweite, der Stickstoffdüngung und der Erntemethode auf Ertrag und Qualität bei Wohlsdorfer Burley. **(Studies of the effect of spacing, nitrogen manuring and method of harvesting on yield and quality of Wohlsdorfer Burley tobacco.)** [Russian and English summaries ½ p. each.]
*Ber. Inst. Tabakforsch. Dresden*, 1956, **3**: 194-221, bibl. 9.

The quality of Wohlsdorfer Burley tobacco lost by wide spacing (20,000 as compared with 40,000 plants per ha.) was partly regained by abandoning priming in favour of the stalk cutting method of harvesting. Although leaves thus harvested were less hygroscopic than primed leaves, they contained 40% less nitrogen, particularly non-protein nitrogen compounds. An increase in N applications from 60 to 90 kg./ha. raised yields but did not increase the N content of leaves harvested by the stalk cutting method. These findings, if confirmed, would make it possible to cut labour requirements by 1,500 man-hours per ha. by combining wide spacing with a high rate of N application and the stalk cutting method of harvesting.

1598. Petrenko, A. G., and Koržina, A. N.
**The physiological and biochemical characteristics of the tobacco variety Ostrolist 2747 grown at different spacings.** [Russian.]
*Tabak*, 1956, **17**(3): 15-17, bibl. 2.

The variety was planted at 60 × 10, 60 × 20 and 60 × 40 cm. The 2 closer spacings gave leaves of lighter colour and higher moisture content but lower dry matter and nicotine contents than the wide spacing. Smoking quality was slightly better at the closer spacings, but in spite of this it is suggested that in the chernozem tobacco soils Ostrolist 2747 should be planted at 60 × 40 cm.

### *Water and other environmental factors.*

1599. Schwartz, D.
Recherche de tests permettant d'évaluer l'influence du milieu sur la variabilité de diverses caractéristiques d'une plante. Applications à la sélection. (**A study of tests which make it possible to evaluate the effect of environment on the variability of several plant characters, and their application in selection.**) [English summary 5 lines.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 322-4.

Comparisons between adjoining plants and between alternate plants in a field have shown environment to be responsible for significant variations in earliness and total height, but not for variations in number of leaves, pigmentation of the stamen filaments, nicotine content, or length of styles. In the case of yield differences the variation between adjoining plants could not be attributed to environment, whereas that of alternate plants was affected by environment to a significant extent.

1600. Pearse, H. L.
**Some effects of climatic factors on the growth and quality of tobacco.** [French summary 6 lines.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 741-5, bibl. 1.

Tobacco plants were grown in chambers where temperature, light intensity and day-length could be controlled. The results showed that low light intensity considerably reduced growth and leaf development and caused a high ratio of stem to root weight. A relatively high night temperature with favourable day temperatures, as compared with a relatively cool night temperature with the same day temperatures, also resulted in reduced growth and leaf size and an increased stem/root ratio. Both low light intensity and high night temperature resulted in cured leaf of low quality with a reduced sugar content and a considerably increased N content. The proportion of root to shoot is also very much reduced by the higher night temperature.—Central Tobacco Res. Stat., Rustenburg, S. Africa.

1601. Dufrenoy, J.
Étude statistique de la correlation entre "heures d'insolation" et "biosynthèse de nicotine". (**A statistical study of the relation between hours of sunshine and nicotine biosynthesis.**) [English summary 7 lines.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 726-31, bibl. 2.

The author examines statistically results obtained at Bergerac, which showed that the level of nicotine in genotypes depends on the number of hours of sunshine during the growing season.

1602. Paul, V.
L'eau et le tabac au Maroc. (**Water and tobacco in Morocco.**)
*Rev. int. Tabacs*, 1956, **31**: 219, 221, bibl. 1.

Under the climatic conditions of Morocco the best irrigation regime was that in which water was supplied every 10–15 days until the end of harvesting. The leaves were thinner, more uniform in size, significantly longer and lower in alkaloid content, and yield was slightly, but not significantly, higher than when irrigation was stopped at the beginning of harvest. Significantly lower yields resulted from a single irrigation either 15 or 40 days after planting.

1603. Matusiewicz, E.
Rozwój i plonowanie tytoniu w różnych warunkach wilgotności gleby. (**The development and yield of tobacco under various soil moisture conditions.**) [English summary 1 p.]
*Roczn. Nauk rol.*, 1956, **72**: 423-33, bibl. 9, illus.

In Polish tests with the tobacco variety Virginia Joyner the complete vegetative period up to seed maturity was shortest at a soil moisture of 60%. The height of plants, number of leaves and seed capsules per plant increased with a rise of soil moisture to 75% and thereafter declined. The yield of green and air dried leaves also reached its maximum at 75% moisture and declined thereafter. The percentage of (air) dry matter was lowest at 30% moisture. At 45% it increased rapidly at first but then fell. At all moisture levels it was highest in the next to top leaves and slightly less in the top leaves of the plant. Yield of seed was greatest at 60% soil moisture. The percentage of seed in relation to unthreshed capsules declined as soil moisture increased.

1604. Matusiewicz, E.
Wpływ niedoboru i nadmiaru azotu w zależności od wilgotności gleby na rozwój roślin, plon i zawartość nikotyny w machorce. (**The influence of nitrogen deficiency and excess, as affected by soil moisture on the development, yield and nicotine content of tobacco.**) [English summary 1 p.]
*Roczn. Nauk rol.*, 1956, **72**: 435-48, bibl. 9, illus.

Tests were made at 3 levels of soil moisture with varying applications of N. N deficiency delayed, but excess N had no effect on, flowering. Both deficiency and excess N retarded leaf maturity to a greater extent than low or high soil moisture. The higher the N application and the higher the soil moisture within the scope of the trial, the more rapid was the growth. The height of plants at blossoming exactly reflected their rate of growth and increased with increased N and soil moisture. Yield of green and air-dried leaves increased greatly as the result of successive N applications. N deficiency resulted in decreased air-dried leaf matter. Yield of stalks and roots followed the same pattern as the leaves. It was found that lower N applications could lessen the negative results of moisture deficiency in this respect. Nicotine content in leaves increased with increased N application, except under conditions of high soil moisture. Generally speaking the effect of N was greater than that of soil moisture.

1605. Middelburg, H. A.
**Irrigation and the combustibility of tobacco.**
[French summary ½ p.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 736-40, bibl. 9.

Irrigation was shown to dilute the soil solution and increase the ratio K/Ca+Mg in it. Differences in chemical composition were observed between irrigated and non-irrigated tobacco, and irrigation was found to favour combustibility. With evaporation after irrigation chlorides and sulphates are brought to the soil surface, and this may result in a decrease in the fire-holding capacity of the leaf.—Lab. agric. Chem., Wageningen.

1606. Noda, A.
**Studies on the submersion tolerance of tobacco plants. I.** [Japanese, with English summary ¾ p.]
*Tech. Bull. Kagawa agric. Coll.*, 1956, **7**: 175-9, bibl. 14, illus.

In 1953 flue-cured tobacco was planted in a sandy loam soil in a paddy field on ridges 12·1 cm., 24·2 cm. and 30·3 cm. high and was flood irrigated for 10 hours a day for 20 days. In 1954 and 1955 potted tobacco plants were placed in water at different depths. Among 6 varieties Bright Yellow proved the most sensitive to submersion. Submersion resulted in severe damage to parts of the root system below the water level. This is thought to be due to lack of aeration and dilution of the soil solution rather than to specific reductions in soil $O_2$ or increases in $CO_2$. Submersion resulted in wilting and later in yellowing of the leaves, and also in reduced carbon assimilation. In paddy fields drainage and high ridging may be necessary to prevent submersion injury. J.R.L.

1607. Harris, D. G., and van Bavel, C. H. M.
**Growth, yield and water absorption of tobacco plants as affected by the composition of the root atmosphere.**
*Agron. J.*, 1957, **49**: 11-14, bibl. 17.

Tobacco plants were grown in sub-irrigated sand cultures. In the gas mixtures supplied to the roots the percentage of nitrogen ranged from 79 to 90, the remainder being oxygen and carbon dioxide in different proportions. In general there was no reduction in leaf elongation, yield or water absorption until the concentration of $CO_2$ was at least equal to that of $O_2$, the effects being most marked on leaf elongation. Even when the entire 20% of $O_2$ was replaced by $CO_2$ the plants survived for several days and wilting was less severe than in typical cases of "drowning" injury in waterlogged soils, where toxic organic compounds are probably more harmful than lack of $O_2$ and accumulation of $CO^2$.—N.C. agric. Exp. Stat., Raleigh.

### *Nutrition.*

(*See also* 1604, 1959w.)

1608. Elliot, J. M., and Vickery, L. S.
**Ontario flue-cured tobacco soils and their fertilizer requirements.**
*Publ. Canada Dep. Agric.* **987**, 1956, pp. 16, illus.

This publication provides information on: (1) the main soil series used for flue-cured tobacco in Ontario, with tabulated data on the chemical and physical characteristics of some of them; (2) the response of tobacco to N, P, K, Cl and Mg, with details of the nutrient uptake by an average tobacco crop; (3) fertilizer formulae and application methods for use directly on tobacco and indirectly on green manure crops, of which rye is the most important; and (4) the control with 2,4-D of vetch, which, occurring as a weed on fertile soils, tends to raise soil N to levels at which tobacco leaf quality suffers.—Tobacco Substat., Delhi, Ont.

1609. Steffens, G. L.
**The effects of legume and non-legume winter cover crops on the growth, quality, and nitrogen nutrition of Maryland tobacco.**
*Diss. Abstr.*, 1956, **16**: 1037, being *Publ.* 16,645 of 120 pp.

A field experiment was carried out in Maryland in which the effects of 10 cover crop [green manure] treatments on growth, quality and N nutrition of Maryland tobacco were studied. Generally vetch as a cover crop produced the highest yield and dollar return per acre for the 5-year period. Tobacco quality as indicated by value per 100 lb., was generally best following legume–non-legume combinations. The effects of the cover crops were least pronounced in the early years of the tests. In the drier years cover crops containing legumes produced the best tobacco, and the dollar return per acre increased as more N was incorporated into the soil. There was a good relationship between the concentrations of nitrate N in the soil and in tobacco midribs. In plants and soil nitrate accumulation was greater following cover crops which contained relatively high amounts of N, as were the percentages of total N, acid insoluble N and total alkaloids in cured leaf tobacco. The percentages of total and acid insoluble N increased from the bottom to the top of the plant. The bright grades contained the highest percentage of total alkaloids. Nitrogenous constituents were higher in the 1954 crop (drier season) than in the 1953 crop. A paper chromatographic method for the determination of total alkaloids was statistically compared with the ultraviolet absorption method, and correlation coefficients were found to be significant. Fire-holding capacity tests, as well as burn and aroma ratings of the bright grade showed that tobacco follow-

ing cover crops containing legumes was better than tobacco following non-legumes for the 1953 and 1954 seasons.—Univ. Md.

1610. Sequeiros, J. M., Galbis, J. A., and Oliver, J.
Études d'engrais en sols tabacicoles espagnols. II.—L'influence de l'azote—nitrique et ammoniacal—et du potassium sur la teneur en chlore de la plante, déduite d'éxperiences en pots et en champ. **(Manurial studies on Spanish tobacco soils. II. The effect of nitrate and ammonia nitrogen and potassium on the content of chlorine in the plant, as observed in pot and field experiments.)** [English summary 9 lines.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 763-71, bibl. 26.

In pot and field experiments the application of nitrogenous fertilizers to acid and calcareous soils resulted in lower Cl percentages in the leaves of tobacco plants. In pots the reduction in leaf Cl content was more marked with nitrate of ammonia than with sulphate of ammonia. In the field the effects were less marked, although in the acid soil sodium nitrate appeared to be the most active. Increasing applications of K in the form of sulphate, with constant N and P, accentuated the reduction of leaf Cl.—Inst. Biol. Tabac, Seville, Spain. [For Part I see *H.A.*, 25: 3017.]

1611. Sequeiros, J. M., Galbis, J. A., and Oliver, J.
Études d'engrais en sols tabacicoles espagnols. III.—L'influence de l'azote—nitrique et ammoniacal—et du potassium sur la teneur cationique, alcaline et alcalino-terreuse de la plante, déduite d'expériences en pots et en champ. **(Manurial studies on Spanish tobacco soils. III. The effect of nitrate and ammonia nitrogen and potassium on the cation, alkaline and alkaline earth contents of the plant, as observed in pot and field experiments.)** [English summary 9 lines.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 772-81, bibl. 87.

Experiments described in Part II [see previous abstract] are further discussed. K uptake was stimulated more by the application of sulphate of ammonia than of nitrate of ammonia. No marked effect of N fertilizers on Ca or Mg uptake was apparent. Increasing K applications generally increased the K content of the leaf, but in the presence of sulphate of ammonia the lowest level of K applied reduced the K content of the leaf by comparison with the control. In general, leaf contents of Mg and Ca were reduced when N and K fertilizers were applied. In the field the application of N fertilizers increased K absorption by the plant, ammonium nitrate being the most active and sodium nitrate generally the least active. In the presence of a given application of N increased applications of sulphate of potash produced nearly proportional increases in leaf-K.—Inst. Biol. Tabac, Seville, Spain.

1612. Anon.
La fumure azotée du tabac. **(Nitrogen manuring of tobacco.)**
*Rev. int. Tabacs*, 1956, **31**: 236, 238.

Results of field experiments in France are summarized. The optimal application for a soil containing 1·2% N was 93 kg. of N per ha., either as ammonium nitrate or as ammoniated calcium nitrate. Increasing this by 50% gave a non-significant yield increase and made drying more difficult.

1613. Merker, J.
Untersuchungen über die günstigste Form der Stickstoffdüngung für Tabak unter Berücksichtigung verschiedener Böden. **(Experiments on the form of nitrogen manuring most favourable to tobacco, with special reference to soil type.)** [Russian and English summaries ½ p. each.]
*Ber. Inst. Tabakforsch. Dresden*, 1956, **3**: 171-93, bibl. 1, illus.

The following results were obtained in glasshouse experiments with tobacco grown in 3 soil types: (1) In the early developmental stages rate of growth depended mainly on soil type but type of N fertilizer also had some effect, this being more marked on light, non-buffered soils than on soils rich in colloids. (2) With regard to yield, calcium ammonium nitrate gave the best results on all three soils. Calcium cyanamide and sulphate of ammonia were satisfactory on certain soils, while urea caused yield reductions in all cases. (3) Quality was hardly affected by any of the fertilizers tested, with the exception of potassium ammonium nitrate which raised the chlorine content to 3–4% of the dry matter.

1614. Volodarskij, N. I.
**The effect of nitrogen on the growing and formative processes in tobacco.** [Russian.]
*Trud. Inst. Fiziol. Rast. Timiryazeva*, 1954, **8**(2): 134-74, bibl. 3½ pp., illus.

The literature is reviewed and experiments are described showing the effect of N on the formation and growth of different organs in tobacco. The N requirement of the tobacco plant was found to vary during its development. Young seedlings need a low but constant supply of N. As the plants grow their N requirement increases, but from the flowering stage onwards the reserve N accumulated during the preceding growth period suffices. The different organs during different stages of development have different N requirements, but as the plant can adapt itself to given conditions of nutrition the most important processes and organs are the first to be provided with N. This enables the tobacco plant grown under diverse conditions of N nutrition to complete its normal growth and reproductive cycle. Under certain conditions, however, N can cause profound changes in the vegetative and reproductive organs, resulting in the disruption of their normal functions. N deficiency when corrected too late can, it is thought, give rise to protein molecules of virus character antagonistic to the parental organism.

1615. Myhre, D. L., Attoe, O. J., and Ogden, W. B.
**Chlorine and other constituents in relation to tobacco leaf-burn.**
*Proc. Soil Sci. Soc. Amer.*, 1956, **20**: 547-51, bibl. 7.

A study was made to evaluate the influence of chlorine and other constituents on tobacco leaf-burn (capacity

to hold fire when ignited). Samples of tobacco plants and soil at different depths were taken from 33 fields located in the 2 tobacco growing districts in Wisconsin in 1952, and the data concerning chemical composition and leaf-burn were subjected to statistical analyses. The amount of chlorine taken up by the crops was most closely correlated ($r=0{\cdot}79$) with that found in the 0 to 12-inch layer of soil. On the average, about half of the chlorine found in this layer was taken up by the crops. A highly significant coefficient of multiple correlation, $R=0{\cdot}80$, was found for the relation between log leaf-burn and the contents of chlorine, sulfur, nitrogen, and potassium of the tobacco leaves. A comparison of the standard coefficients indicated that potassium is about 1·2 times more beneficial to leaf-burn than either chlorine or nitrogen is detrimental and about 2·4 times as beneficial as sulfur is detrimental. [Authors' summary.]—Wis. agric. Exp. Stat., Madison.

1616. Thomson, R., Watson, J., and Monk, R.
**Use of lime on flue-cured tobacco.**
*N.Z. J. Sci. Tech., Sect. A*, 1956, **38**: 299-308, bibl. 5.

The use of ground limestone at ½ ton per acre every second year for 8 years brought about a highly significant increase in tobacco yields, averaging 85 lb. leaf/acre/season, without any delay in maturity or reduction in quality. Soil analysis showed that exchangeable Ca was increased but that exchangeable K and Mg were scarcely affected. Leaf analysis showed that soluble ash and Ca contents, which were increased, were the only mineral constituents of the cured leaves to be significantly affected. Total reducing sugars and N contents were unaltered. The pH of the soil, however, was raised to a level, which would be undesirable in areas where black root-rot occurred.—Tobacco Res. Stat., Motueka, and Cawthron Inst., Nelson.

J.R.L.

1617. Steinberg, R. A., and Jeffrey, R. N.
**Effect of micronutrient deficiencies on nicotine formation by tobacco in water-culture.**
*Plant Physiol.*, 1956, **31**: 377-82, bibl. 8.

Total alkaloid per plant was increased markedly by B deficiency and significantly by excesses of Mo or Zn. It was decreased by deficiencies of Fe, Zn, Cu, Mn or Mo and by excesses of Fe, Cu or Mn. Yields were consistently reduced by deficiency or excess of any of these 6 elements. Alkaloid increase was accompanied by increased root branching and irregular distribution of alkaloid between leaves and roots. Nornicotine occurred in green leaves only when Mg and Mo were deficient.—U.S.D.A., Beltsville, Md.

1618. Thomson, R., and Monk, R.
**Boron and flue-cured tobacco.**
*N.Z. J. Sci. Tech., Sect. A*, 1956, **38**: 326-31, bibl. 6.

The addition of borax at the rate of 5 lb. per acre to flue-cured tobacco fertilizer resulted in some increase in yield and a marked increase in leaf quality; 10 lb. per acre caused some delay in early growth and subsequent maturity of the crop. There appeared to be a correlation between the effect of B on the crop and the rainfall at planting time. Use of borax exerted little or no effect on the reducing sugars and N contents of the leaves. The B content of the leaves was increased proportionally to the amount of borax used. Seasonal effects on the N and B levels in the leaf were noted. [Authors' summary.]—Tobacco Res. Stat., Motueka, and Cawthron Inst., Nelson.

### *Physiology and biochemistry.*

(*See also* 1014, 1022, 1038, 1617, 1655a, k, t.)

1619. Dufrenoy, J.
La croissance, phénomène autocatalytique. **(Growth, an autocatalytic phenomenon.)** [English summary 5 lines.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 722-5, bibl. 2.

Growth in tobacco may be considered as the expression of an autocatalytic process, and may be expressed in terms of Robertson's curve or H. S. Reed's curve, both of which are sigmoid.—Conservatoire nat. Arts Métiers, Paris.

1620. Fardy, A.
L'ontogénèse et la différenciation de quelques propriétés technologiques des feuilles de tabac. **(Ontogenesis and the differentiation of some technological properties of tobacco leaves.)** [English summary 6 lines.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 732-5, bibl. 8.

The author discusses the effect of cellular differentiation on the characteristics of different leaves of tobacco, with reference to colour, physical properties and flavour.—École supérieure Agron., Athens.

1621. Philipp, W.
Die Hygroskopizität als Merkmal zur Unterscheidung von Tabaken und eine Methode zur Untersuchung des Tabaks auf seine Hygroskopizität. **(Hygroscopicity as a characteristic to be used in the differentiation of tobaccos and a method of determining hygroscopicity in tobacco leaves.)** [Russian and English summaries ⅓ p. each.]
*Ber. Inst. Tabakforsch. Dresden*, 1956, **3**: 282-309, bibl. 20.

The hygroscopicity of tobacco was found to vary as much as the chemical composition or physical structure according to variety, locality and leaf position. The absorption and emission of water vapour were further shown to depend on temperature and relative humidity. A method is described for the determination of hygroscopicity in tobacco leaves.

1622. Stephenson, M. L., Thimann, K. V., and Zamecnik, P. C.
**Incorporation of $C^{14}$-amino acids into proteins of leaf disks and cell-free fractions of tobacco leaves.**
*Arch. Biochem. Biophys.*, 1956, **65**: 194-209, bibl. 27.

Several $C^{14}$-labelled amino acids were incorporated into the proteins both of intact leaf disks and of cell-free extracts of tobacco leaves. There is evidence that the microsomal fraction rich in ribonucleic acid is the initial site of incorporation of amino acids into protein, and also that, under cell-free conditions, photosynthetic

energy is coupled to protein synthesis. Where leaves infected with tobacco mosaic virus were used TMV became labelled during the incubation of intact cells with $C^{14}$-amino acid, but there was no synthesis of the virus in the cell-free preparations.—Harvard Univ., Cambridge, Mass.

1623. Glock, E.
**Enzymes of the tricarboxylic acid cycle in tobacco seedlings.**
*Diss. Abstr.*, 1956, **16**: 1330-1, being *Publ.* 16,712 of 106 pp.

Several enzymes have been identified in extracts of tobacco seedlings. The evidence presented suggests that the tricarboxylic acid cycle of Krebs operates in young tobacco seedlings.—Pa St. Univ.

1624. Madison, J. H., Jr.
**The intracellular location of phosphorylase in tobacco (*Nicotiana tabacum* L.).**
*Plant Physiol.*, 1956, **31**: 387-92, bibl. 17, illus.

Phosphorylase was found to be concentrated in the plastids of leaves that were actively synthesising starch and in the cytoplasm of leaves kept in darkness to remove starch.—Univ. Calif., Davis.

1625. Pyriki, C., Müller, R., and Herrmann, R.
Die Veränderungen der Alkaloide des Tabaks und ihre gegenseitige Umwandlung unter dem Einfluss von Pfropfungen. **(Changes in the alkaloids of tobacco and their conversion under the influence of grafting.)** [Russian and English summaries ¾ p. each.]
*Ber. Inst. Tabakforsch. Dresden*, 1956, **3**: 248-81, bibl. 10.

Nicotine, nornicotine and anabasine were determined quantitatively in a number of *Nicotiana* spp., all of which contained the three alkaloids, except *N. longiflora* and *N. glauca* in their early developmental stages. With most species the site of maximum alkaloid content was found to move from the roots to the leaves in the course of plant development, but in some species low in alkaloids, such as *N. affinis*, *N. alata* and red ornamental tobacco (*N. longiflora*?), the roots continued to contain more alkaloids than the leaves and stems. Topping did not affect the alkaloid content of the roots but greatly increased that of stems and leaves. The leaves of some species, whether grafted or not, showed the capacity to convert nicotine into nornicotine. Grafts with *N. glauca*, *N. longiflora* and *N. glutinosa* as scions revealed this faculty for conversion to a high degree. Measurable amounts of nornicotine, as well as of nicotine and anabasine, were detected in the roots of several *Nicotiana* spp.

1626. Cota Galan, R.
Étude de la formation de la nicotine chez certaines variétés de *Nicotiana rustica* cultivées en serre. **(Study of the formation of nicotine in certain varieties of *Nicotiana rustica* grown under glass.)** [English summary 10 lines.]
*Prem. Congr. sci. int. Tabac, Paris*, 1955, pp. 187-210, bibl. 40.

Nicotine formation was studied in 12 varieties of *N. rustica* in relation to time of topping and mineral fertilization. The plants were analysed at 4 stages of growth. In general nicotine content tended to decrease from the time of flower bud formation until the appearance of the first flower, and then in some varieties rose again up to the stage of maturity. Further rises generally occurred from this stage until the fruit capsules ripened. The varieties Erbasanta, Bolsunov 5 and Samenran responded well to a normal dosage of N (0·45 g. per pot), but with Bakoum Nigra and Berzili marked increases in nicotine content only occurred when a double dose of N was given. Early topping generally gave the best results except for the variety Bakoum Nigra which showed a marked response to late topping. The varieties Bolsunov 5, Samenran and Erbasanta showed promise for cultivation in Spain.—Inst. Biol. Tabac, Seville.

1627. Aronoff, S.
**Experiments on the biogenesis of the pyridine ring in higher plants.**
*Plant Physiol.*, 1956, **31**: 355-7, bibl. 22.

Uniformly labelled anabasine was formed in excised leaves of *Nicotiana glauca* during photosynthesis in $C^{14}O_2$. It was found that neither lysine-2-$C^{14}$ nor hydroxylysine-6-$C^{14}$ are definitive precursors for anabasine, but glucose-U-$C^{14}$ may be used as an ultimate precursor. It is suggested that, as with nicotine biosynthesis [*H.A.*, 26: 3872], nicotinic acid may serve as the precursor of the pyridine ring of anabasine and other pyridine-containing compounds. Investigations on the formation of trigonelline in soya bean leaves are also reported.—Ia St. Coll., Ames.

1628. Byerrum, R. U., Sato, C. S., and Ball, C. D.
**Utilization of betaine as a methyl group donor in tobacco.**
*Plant Physiol.*, 1956, **31**: 374-7, bibl. 12.

It has been shown that the methyl groups of betaine may be incorporated into the N-methyl group of nicotine in tobacco plant metabolism. The extent of incorporation of betaine methyl groups was about the same as the methyl group of methionine and the methyl groups of choline. When choline-methyl-$C^{14}$ was fed to tobacco plants, radioactive betaine and dimethylglycine appeared. This result was interpreted to mean that a choline oxidase system was present in these plants and that some choline was oxidized to betaine before methylation of nicotine occurred. [Authors' summary.]—Mich. St. Univ., E. Lansing.

### *Desuckering.*

1629. Calvert, J.
**Mineral oils and the control of lateral growth in North Queensland tobacco.**
*J. Aust. Inst. agric. Sci.*, 1956, **22**: 266-71, bibl. 13.

Thirteen highly refined colourless mineral oils were tested for their capacity to inhibit sucker growth on tobacco after topping. They were applied automatically during topping to the cut end of the stem [see *H.A.*, 23: 116] at the rate of 2·5–3·5 ml. per plant. A single dose of any of the oils significantly inhibited sucker growth, the degree of control being equivalent

to that obtained by repeated hand suckering. Although there were significant differences between the effectiveness of the oils, these differences were not consistent for the various locations and seasons. The time taken to top and treat the crop with oil was less than one tenth of that required to obtain the same control by hand suckering. No phytotoxicity or adverse effects on the quality of the cured leaf were observed as a result of oil treatment.—C.S.I.R.O., Canberra.

1630. Calvert, J.
**Leaf quality in flue-cured tobacco in North Queensland as influenced by sucker growth and leaf maturity.**
*J. Aust. Inst. agric. Sci.*, 1956, **22**: 272-8, bibl. 10, illus.

The control of sucker growth in plants which have been topped, either with a single application of oil or by frequent hand suckering, significantly reduces the incidence of worthless leaf in the cured crop. The leaves normally picked at each harvest have a range of maturity and the worthless cured leaves arise from the over-mature fractions. The elimination of inflorescences and suckers slows down the rate of senescence and consequently narrows the maturity range within the leaves of each harvest. [From author's summary.]—C.S.I.R.O., Canberra.

### *Diseases and pests.*

(*See also* 1262, 1324, 1567, 1581, 1655b, c, f-j, l, m, q-s, 1960c.)

1631. Pavillard, J.
L'influence de divers virus sur la teneur en auxine des tabacs. **(The effect of various virus diseases on the auxin content of tobacco.)** [English summary 12 lines.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 658-68, bibl. 52, illus.

Virus-diseased tobacco plants had lower auxin contents in all organs than healthy plants of the same age. After virus inoculation the auxin level declined and the plants became stunted. In certain albino tobaccos reduced leaf chlorophyll was also associated with lower auxin content.—Lab. bot. E.N.S., Paris.

1632. Chessin, M.
**The influence of mineral nutrition on the susceptibility of *Nicotiana glutinosa* to infection by tobacco mosaic virus.** [English and French.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 616-17.

The effect of some microelement deficiencies on susceptibility to virus infection was studied in the greenhouse. Ca deficiency consistently reduced susceptibility to the virus. Mg deficiency also tended to reduce susceptibility, but only after severe deficiency symptoms had appeared. The effect of S deficiency was markedly affected by time of year, with a significant reduction in susceptibility in winter-grown plants. In general Fe-deficient plants also showed reduced susceptibility. Local lesions on Fe- and S-deficient plants were larger than those on control plants; neither Ca nor Mg nutrition affected lesion size [see also *H.A.*, 25: 4100].—Montana St. Univ., Missoula.

1633. Fracanzani, G. A.
Tabacco—irrigazione—"mosaico". **(Tobacco—irrigation—mosaic.)**
*Agric. Venezie*, 1956, **10**: 675-7.

Chilling of plants by cold irrigation water in hot sunny weather increases their susceptibility to mosaic virus.

1634. Fairbanks, A. J., Jr.
**The effects of X-rays on the biosynthesis of tobacco mosaic virus.**
*Diss. Abstr.*, 1956, **16**: 1712, being *Publ.* 17,185 of 107 pp.

Tobacco leaves were inoculated with tobacco mosaic virus, and irradiated at different periods after inoculation. In infected leaves irradiated 80 to 120 hrs after inoculation subsequent synthesis of TMV was markedly inhibited.—Washington Univ.

1635. Thresh, J. M.
**Some effects of tannic acid and of leaf extracts which contain tannins on the infectivity of tobacco mosaic and tobacco necrosis viruses.**
*Ann. appl. Biol.*, 1956, **44**: 608-18, bibl. 32.

The inhibition of infection by tobacco necrosis and tobacco mosaic viruses by tannic acid, and by extracts of raspberry and strawberry leaves, was associated with the precipitation of the viruses. Precipitation and inhibition were reversible, and infective virus was obtained from the precipitate formed between the viruses and tannins. Infectivity was fully restored by diluting mixtures of virus and tannin adequately and partially restored by adding alumina or nicotine sulphate. Viruses and tannins are thought to form non-infective complexes, in which the virus and tannin components are held together by co-ordinate linkages or hydrogen bonds. [From author's summary.]—Rothamsted exp. Stat.

1636. Hitier, H., and Izard, C.
Lutte contre le feu sauvage du tabac (*Pseudomonas tabaci*), au moyen des antibiotiques. **(Control of tobacco wild fire by means of antibiotics.)** [English summary 6 lines.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 635-8, bibl. 4.

In laboratory tests terramycin was more toxic to *Pseudomonas tabaci* than was streptomycin. Under practical conditions, however, streptomycin was the more effective, and tests showed that satisfactory protection was obtained without phytotoxicity by sprays at 200 mg./l. [see also *H.A.*, 26: 3881]. Spraying at weekly intervals is recommended when the weather is warm and humid.—Inst. exp. Tabac, Bergerac.

1637. Anon.
**Blue mould of tobacco.**
*Rur. Res. C.S.I.R.O.*, 1956, No. 17, pp. 19-20, bibl. 2, illus.

It has been shown that the incidence of blue mould [*Peronospora tabacina*] is greater in unhoed rows of tobacco than in hoed rows, owing most probably to protracted moist conditions in the former. The efficiency of benzol as a volatile fungicide is reduced by moisture on the leaves, and more benzol is required for adequate seedling protection in wet conditions. Zineb

and streptomycin have not given good control of blue mould in seedlings. [See also *H.A.*, 25: 4075.]

1638. Hill, A. V., and Mandryk, M.
**Influence of moisture on efficiency of benzol in the control of blue mould of tobacco.**
*J. Aust. Inst. agric. Sci.*, 1956, **22**: 214-17, bibl. 4, illus.

In experiments with tobacco seedlings grown in 4 in. pots and 60×30 cm. flats it was found that more benzol was required to prevent blue mould (*Peronospora tabacina*) infection in wet seedlings than in dry. The efficiency of benzol as a volatile fungicide was also reduced by water on the leaves and by wet conditions in the seedbed.—C.S.I.R.O., Canberra. J.R.L.

1639. Ciferri, R.
La lutte contre l'oïdium du tabac avec le Karathane. **(Control of powdery mildew of tobacco by Karathane.)** [English summary 8 lines.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 618-21, bibl. 12.

Karathane at 0·08% or 0·1% gave excellent control of *Erysiphe cichoracearum* on Xanthi Yaka tobacco, without affecting its flavour or aroma. The spray showed a good residual action.—Univ. Pavia.

1640. Morgan, O. D.
**Control of *Fusarium* wilt and root-knot nematode of tobacco with soil fumigants.**
*Plant Dis. Reptr*, 1957, **41**: 27-32, bibl. 26, illus.

In 3 experiments where soil fumigants were tested for the control of root-knot nematode there was a very significant reduction of *Fusarium* wilt. The disease was reduced from 22·3% infected plants in the controls to 2·93% by 5 gal./acre EDB, to 2·72% by 2·5 plus 2·5 gal./acre split treatment of EDB and to 6·22% by 20 gal./acre D-D. All treatments gave good control of the nematode, although the population increased at the end of the season. The greatest increase in yield was obtained with 5 gal./acre EDB.—Md agric. Exp. Stat. J.R.L.

1641. Guthrie, F. E., Rabb, R. L., and Van Middelem, C. H.
**Control of aphids on cigar-wrapper and flue-cured tobacco.**
*J. econ. Ent.*, 1956, **49**: 602-6, bibl. 9, illus.

In tests conducted on shade-grown tobacco in Florida 1% parathion, 2·5% Metacide, 5% malathion, 2·5% Chlorthion and 5% Diazinon dusts gave excellent control of green peach aphid, *Myzus persicae*. On flue-cured tobacco parathion, malathion and Chlorthion gave very good control and endrin reduced aphid populations considerably. Shade cloth had a considerable screening effect on both dust and spray treatments applied by aircraft. About one third of the dust and half of the spray materials were retained by a dry shade cloth, and about two thirds of the dust by a damp shade cloth.—Fla and N.C. agric Exp. Stats.

1642. Guthrie, F. E.
**Comparative toxicity of insecticides to the tobacco hornworm *Protoparce sexta* (Johan).** [French summary 7 lines.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 626-9, illus.

In toxicity tests against larvae of the tobacco hornworm endrin was the most effective insecticide. All the compounds tested were more effective as stomach poisons than as contact poisons, except lindane and perthane.—N.C. St. Coll., Raleigh.

1643. Nizi, G.
Serie di esperienzie di lotta contro gli insetti terricoli dannosi alle coltivazioni. **(Series of experiments on control of soil insects harmful to crops.)**
*Ann. Fac. Agrar. Perugia*, 1955, **11**: 39-65, bibl. 28, illus.

Wireworms disappeared inexplicably from a field of transplanted tobacco, allowing comparison of the direct effects of 8 insecticides on the crop. Yields were reduced by soil applications of parathion at 20 kg./ha. aldrin, α-BHC or toxaphene at 40 kg., heptachlor at 50 kg., and chlordane or dieldrin at 60 kg. The lowest yields were from toxaphene-treated plots. There was a slight increase in yield from some, but not all, plots treated with ordinary BHC at 50 kg./ha. In another experiment, where irrigation was necessarily above normal, BHC, chlordane and heptachlor failed to control wireworms and larvae of *Agrotis* spp., and aldrin gave incomplete control. It is suggested that the control method successfully used against wireworms and other soil pests in sugar beet fields, i.e. a border furrow 35 cm. deep and the same width, dusted with γ-BHC at 80 g. per sq. m., refilled with soil and dusted similarly on the surface, might have advantages in tobacco fields.

1644. Persing, C. O.
**Use of sodium N-methyl dithiocarbamate in control of pests affecting tobacco.** [French summary ¼ p.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 669-73, bibl. 6.

It has been shown in field experiments that the rapid liberation of methyl isothiocyanate from sodium N-methyl dithiocarbamate (Compound N-869) provides an economical and effective method of soil fumigation. Promising results from fumigation tests have been obtained against weeds, nematodes, soil fungi, and insects. Tobacco has been included as a test crop, but general recommendations cannot yet be given.—Stauffer Chem. Co., Mountain View, California.

### *Curing and fermentation.*

(*See also* 1655u.)

1645. Sunjic, K.
Influence des différentes méthodes de séchage sur la qualité du tabac et la composition chimique des variétés d'Istrie et de Ravnjak (Herzégovine). **(The effect of different methods of curing on tobacco quality and the chemical composition of the varieties of Istria and Ravnjak (Hercegovina).)** [English summary 10 lines.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 501-5, bibl. 6.

Quality and composition were studied with sun-cured and flue-cured tobacco from 2 coastal areas of Yugoslavia. With top leaves flue-curing produced the lighter

coloured and more uniform product, and it did not affect the aroma of these tobaccos. Sun-cured leaves had lower protein and nicotine contents and a higher ammonia content than flue-cured leaves. During sun-curing the loss of carbohydrates was greater than during flue-curing.—Inst. Tabacs, Zagreb.

1646. Pack, A. B.
**Influence of drying rate during curing on the physical properties and quality of shade-grown tobacco.**
*Bull. Conn. agric. Exp. Stat.* **599**, 1956, pp. 31, bibl. 4.

Mature leaves of Connecticut 49 were cured in atmospheres of controlled dry- and wet-bulb temperatures, relative humidity and air velocity. It was found that the drier the atmosphere the faster was the rate of weight loss during the first 4 or 5 days of curing, but that with both fast and slow drying the leaves lost almost all their moisture in 13 days. The higher the leaf position on the stalk the greater was the percentage of weight retained. The process of yellowing was accelerated by increasing the rate of drying. The colour of a leaf appeared to be closely related to its moisture content; the deep green colour remained until about 20% of the original weight was lost, yellowing was most intense when the moisture loss reached 35–55%, and brown pigments did not appear until the weight was only 30–40% of the original. An increase in the rate of drying resulted in a more uniform colour in the cured leaf and in greater amounts of green colour appearing, while decreasing the rate favoured darker shades of brown and increased amounts of red. Quality and grade distribution were superior with the faster rate of drying, but tobacco of high quality was not obtained in any of the cures. J.R.L.

1647. Rollin, L.
La pratique de la fermentation pré-accélérée. **(The practical application of "pre-accelerated" fermentation.)** [English summary ¼ p.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 485-92, illus.

The practical processes employed at the Tabacoop Kabyle, Algeria, in which a starter is used for tobacco fermentation, are described. Tobacco fermented in this way contains slightly less nicotine and has better combustibility than tobaccos fermented in the usual way.

1648. Grob, K., and Baebler, S.
Le déclenchement de la fermentation du tabac avec de l'oxyde d'éthylène. **(Starting tobacco fermentation with ethylene oxide.)** [English summary 8 lines.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 453-7, bibl. 4.

Tests have confirmed the hypothesis that a starting agent (ethylene oxide) can increase the rate and extent of tobacco fermentation at a given humidity. An increase in pH of the water extract and an increase in solubility of nitrogen compounds indicate that the action of ethylene oxide is the esterification of groups of protein compounds.—Polus S.A., Balerna, Switzerland.

1649. Ollero, A., and Cortès, V.
Perte de matière sèche dans la fermentation. **(Loss of dry matter during fermentation.)** [English summary 9 lines.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 481-4, bibl. 13.

An indirect method of analysis has been used which is based on the fact that certain substances, chiefly mineral elements, remained unaltered during fermentation. The middle leaves from the Valencia variety were used and calcium was taken as the stable element. Results show that losses in dry matter varied from 2·42 to about 4%. Flame photometry as a means of simplifying Ca analysis is being studied.—Inst. Biol. Tabac, Seville.

1650. Ollero, A., and Paneque, A.
Étude sur la catalase du tabac. Thermostabilité de l'enzyme et détermination de son activité. **(Study of catalase in tobacco. The thermostability of the enzyme and determination of its activity.)** [English summary 7 lines.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 466-80, bibl. 21.

Different methods of determining enzyme activity during tobacco fermentation are compared; the Warburg method is preferred by the authors and the most suitable conditions for its use are discussed. Studies of the resistance of catalase to heat have shown that inactivation is almost complete after heating for 7 hours at 80° C.—Inst. Biol. Tabac, Seville.

1651. Tisnes, P. J., and Chaput, A.
Étude chromatographique des variations des acides aminés libres du tabac au cours de la fermentation accélérée et naturelle. **(A chromatographic study of variations in the free amino acids in tobacco during accelerated and natural fermentation.)** [English summary 8 lines.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 506-11, bibl. 5, illus.

Amino acids detected in air-dried tobacco by chromatography are listed. Most of the acids disappeared during fermentation, the disappearance being more marked during natural than during accelerated fermentation.—S.E.I.T.A.

1652. Frankenburg, W. G., and others.
**The effect of drying and fermentation on the nitrogen compounds in cigar tobacco leaves.** [English and French.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 426-35.

The author describes briefly chemical changes which affect nitrogenous compounds during curing and fermentation of cigar filler (Pennsylvania Broadleaf) and cigar wrapper (Connecticut Shade) tobaccos. During the first 8 days of curing wrapper tobacco the disappearance of the protein is paralleled by the appearance in the water-soluble fraction of 85% asparagine and aspartic acid, 8% of histidine and 7% of serine, arginine, proline and phenylalanine. In the cigar filler tobacco proteolysis resembled that for wrapper tobacco, but residual amounts of amino acids after curing were much smaller and the amount of ammonia was considerably larger. During fermentation the

main change in wrapper leaves was the transformation of asparagine into aspartic acid and ammonia. In filler leaves the small quantity of free water-soluble amino acids left after curing was still further deaminated. Curing resulted in a loss of about 10% of the alkaloids present in the leaf. In wrapper leaves there was little further change in alkaloid content during fermentation, but in filler tobacco there was a further transformation of nicotine into pyridine compounds. The amounts of nitrate N varied between 0·2 and 1% of the dry leaf weight. A decrease of nitrates in the leaf blades observed after curing was found to be caused by a rapid migration of potassium nitrate to the midrib of the leaves.—Gen. Cigar Co. Inc., Lancaster, Pa.

1653. FRANKENBURG, W. G., GOTTSCHO, A. M., AND VAITEKUNAS, A. A.
**Biochemical changes of nicotine.** [English and French.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 419-25.

The authors summarize their work on nicotine degradation. Most, if not all, of the oxidative changes affecting nicotine in fermenting tobacco leaves are limited to the pyrrolidine ring. The quantity of nicotinic acid in fermented leaves is much higher than is usual in vegetable materials. In studies on the bacterial degradation of nicotine *in vitro* it was shown that an oxidative breakdown occurred both in the pyrrolidine ring and in the pyridine ring of the alkaloid molecule.—Gen. Cigar Co. Inc., Lancaster, Pa. [See also *H.A.*, 26: 1877 and 1878.]

1654. FRANKENBURG, W. G., AND VAITEKUNAS, A. A.
**The chemistry of tobacco fermentation. I. Conversion of the alkaloids. D. Identification of cotinine in fermented leaves.**
*J. Amer. chem. Soc.*, 1957, **79**: 149-51, bibl. 6.

Among the conversion products of nicotine present in fermented cigar tobacco leaves, cotinine (N-methyl-2-(3-pyridyl)-5-pyrrolidone) has been identified as a major component. Cotinine was also found among the autoxidation products formed from nicotine on standing. [Authors' abstract.]—Res. Lab., General Cigar Co., Lancaster, Pa.

*Noted.*

1655.

a ABDOH, Y.
Formation de nicotine dans les bourgeons et les feuilles de tabac. (**The formation of nicotine in buds and leaves of tobacco.**) [English summary 11 lines.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 401-2, bibl. 8.

b BERGER, P.
Über die Verwendung einiger chemischer Pflanzenschutzmittel im Tabakbau. (**On the use of certain fungicides and insecticides in the culture of tobacco.**) [Russian and English summaries ½ p. each.]
*Ber. Inst. Tabakforsch. Dresden*, 1956, **3**: 222-47, bibl. 52.
A review of the literature and tests of proprietary compounds manufactured in East Germany.

c BOVEY, R.
Note sur un virus nécrotique du tabac observé en Suisse en 1954 et 1955. (**Note on a necrotic virus of tobacco observed in Switzerland in 1954 and 1955.**) [English summary 5 lines.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 602-3.
Symptoms and mechanical transmission.

d BUKOVAC, P.
Recherche sur la composition minérale des tabacs d'Herzegovine et de Dalmatie. Variations biochimiques pendant la germination. (**Studies on the mineral composition of tobacco from Hercegovina and Dalmatia. Biochemical variations during germination.**) [English summary 15 lines.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 412-16, bibl. 4.
Regional differences in composition of a semi-oriental type.

e CARIDAD IGELMO, J. M.
L'expérimentation, instrument fondamental dans l'amélioration des tabacs. (**Experiments, the fundamental instrument of tobacco improvement.**) [English summary ¼ p.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 310-15.
Including work at the Inst. Tob. Biol., Seville.

f CARTWRIGHT, T. E., RITCHIE, A. E., AND LAUFFER, M. A.
**The reaction of tobacco mosaic virus with formaldehyde. III. Kinetics of the loss of infectivity.**
*Virology*, 1956, **2**: 689-702, bibl. 34.

g FLETCHER, F. W., AND BIRON, R. A.
**Soil fumigation for the control of tobacco pests in the U.S.A.** [French summary ¼ p.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 622-5.
A review.

h HAZLETON, L. W.
**Problems pertaining to toxicity of cholinesterase inhibitors.** [French summary 1 p.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 630-4, bibl. 5.
A review.

i JEENER, R.
**Biological effects of the incorporation of thiouracil into the ribonucleic acid of tobacco mosaic virus.**
*Biochim. biophys. Acta*, 1957, **23**: 351-61, bibl. 16.
Work throwing light on the inhibitory action of thiouracil.

j KOCH, L. W.
**Tobacco diseases in Canada: Their occurence, relative importance and measures for control.**
*Lighter*, 1956, **26**(4): 10-16.
Seedbed and field diseases caused by fungi, viruses and nematodes.

k LUND, H. A.
**The biosynthesis of indoleacetic acid in the styles and ovaries of tobacco preliminary to the setting of fruit.**
*Plant Physiol.*, 1956, **31**: 334-9, bibl. 21.
**Growth hormones in the styles and ovaries of tobacco responsible for fruit development.**
*Amer. J. Bot.*, 1956, **43**: 562-8, bibl. 40, illus.
See *H.A.*, 26: 63.

l MARCELLI, E.
Essais et observations sur la nature virale du "verderame". **(Tests and observations on the viral nature of green spot.)** [English summary 5 lines.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 639-51, bibl. 14, illus.
Symptoms induced in Samsoun tobacco by inoculation described.

m MOORE, E. L., AND OTHERS.
**Black shank resistance in flue-cured tobacco as influenced by tolerance to certain parasitic nematodes.**
*Phytopathology*, 1956, **46**: 545-50, bibl. 13, illus.

n OKA, H.
**On the native varieties of tobacco in Japan.** [French summary ⅓ p.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 317-21.

o PERLUSZ, T., AND NEMETH, L.
Méthode chromatographique sur papier de détermination des alcaloïdes du tabac. **(A paper chromatographic method of determining tobacco alkaloids.)**
[*Publ.*] *Commiss. int. Ind. agric.*, from abstr. in *Rev. int. Tabacs*, 1956, **31**: 209-10, bibl. 28.
Quantitative determination of nicotine, anabasine and nornicotine at Hungarian Tob. Res. Inst.

p REDDIE, K. K.
**Isolation and properties of ribosenucleic acid from tobacco leaves.**
*Biochim. biophys. Acta*, 1957, **23**: 208-10, bibl. 13.

q RUBIO, M.
**Origin and composition of cell inclusions associated with certain tobacco and crucifer viruses.**
*Phytopathology*, 1956, **46**: 553-6, bibl. 12, illus.

r STAHMANN, M. A., HAGEDORN, D. J., AND KAESBERG, P.
**Electron microscopy of tobacco mosaic virus.** [French summary ⅓ p.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 676-83, bibl. 7, illus.
Technique discussed.

s THUNG, T. H.
**Soil borne tobacco viruses.** [English and French.]
*Prem. Congr. sci. int. Tabac, Paris, 1955*, pp. 684-5, bibl. 4.
Rattle and necrosis viruses.

t TOLNAY, P., AND LUMNITZER, G.
Recherches sur les protéases du tabac. **(Investigations on tobacco proteases.)**
[*Publ.*] *Commiss. int. Ind. agric.*, from abstr. in *Rev. int. Tabacs*, 1956, **31**: 210, bibl. 9.
Proteinase and peptidase in leaf sap studied at Hungarian Tob. Res. Inst.

u WADSWORTH, W. S., JR.
**Products of nicotine degradation by *C. nicotinovorum*.**
*Diss. Abstr.*, 1956, **16**: 1336, being *Publ.* 16,735 of 76 pp.
The role and effects of *Corynebacterium* in fermentation.

## MISCELLANEOUS TEMPERATE AND TROPICAL PLANTS.

### *Condiment and spice plants.*

(*See also* 1701a, b, d, 1960c.)

1656. JANNONE, G., AND BINAGHI, G.
Caso d'infestazione entomatica di fettucce secche di radici di cicoria e impiego di un impianto di fumigazione sotto vuoto. **(A case of insect infestation of dry slices of chicory root and use of a vacuum fumigation plant.)** [English summary 1 p.]
*Ann. Sper. agrar.*, 1956, **10**: 2045-69, bibl. 6, illus.

The insects infesting chicory roots stored in bags were *Stegobium paniceum*, *Plodia interpunctella*, *Oryzaephilus surinamensis*, *Tribolium confusum*, *Tenebroides mauritanicus*, *Tenebrio obscurus* and *Pyralis farinalis*. Heating to 60° C. and spraying with various insecticides were rejected in favour of vacuum fumigation for 1 hr. with methyl bromide at 400 g./7 cu. m. at a vacuum of 700 mm. of mercury. Adults of *O. surinamensis* did not all die until 20 hrs. after treatment. Some adults of *Tenebroides mauritanicus* and *Tenebrio obscurus* and larvae of the latter lived for 10 hrs. after treatment.

1657. GATTY, R.
**Kava—Polynesian beverage shrub.**
*Econ. Bot.*, 1956, **10**: 241-9, bibl. 40, illus.

An infusion made from the roots of *Piper methysticum*, which has mild narcotic properties, is used as a ceremonial and social drink and as a medicine in Polynesia. Information is given on planting, cultivation, varieties and marketing.

1658. ANON.
**Raising pepper vine—a new method.**
*I.C.A.R. Farm News Release* **208**, from abstr. in *South Indian Hort.*, 1956, **4**: 32.

Success was obtained with single-node cuttings, which began growth earlier if leafless, but gave a higher percentage survival when the leaf was present. The vertical planting position was best and some cuttings rooted from the base as well as from the node.

1659. HASSELSTROM, T., AND OTHERS.
**Composition of volatile oil of black pepper, *Piper nigrum*.**
*J. agric. Food Chem.*, 1957, **5**: 53-5, bibl. 29.

The characteristic odour of the essential oil of black

pepper is due to small amounts of oxygenated terpenes. Those isolated and identified included piperonal, dihydrocarveol, caryophyllene oxide, cryptone and an alcohol.

1660. Jensen, H. J., and Horner, C. E.
**A decline of peppermint caused by an ecto-parasitic nematode, *Longidorus sylphus*.**
From abstr. in *Phytopathology*, 1956, **46**: 637.

A decline of peppermint in Oregon has been shown to be the result of high populations of the nematode *Longidorus sylphus*. Preliminary results from soil fumigation experiments are encouraging, but general recommendations cannot yet be made.

1661. Coveney, R. D., Matthews, W. S. A., and Pickering, G. B.
**Second report on sage leaves from Cyprus.**
*Colon. Plant Anim. Prod.*, 1955 (issued 1956), **5**: 322-30.

Samples of *Salvia cypria* leaves were collected from the northern coastal plain and the south-western massif. The brown-tinted leaves had the highest camphor content. From July 1952 to March 1953 combined oil yield gradually decreased, the time of maximum varying with locality and being earlier with earlier flowering. The oils varied little in specific gravity, refractive index and solubility in alcohol. High optical rotation values were associated with high ketone contents. Mountain samples gave higher values than coastal samples, the former being dextro- and the latter laevo-rotatory. The hydrocarbon content was highest in early spring and the more valuable oxygenated compounds increased as the season progressed. [For previous report see *H.A.*, 24: 2891.]

### *Drug plants.*

(*See also* 1045, 1585c, 1657, 1701c, i, m, p, r, 1755, 1957.)

1662. Pomini, L.
Quattro lustri di coltivazione sperimentale e pratica di piante officinali ed utili in Provincia di Vercelli, 1934–1953. **(Four five-year periods of experimental and practical cultivation of medicinal and useful plants in the province of Vercelli.)**
*Collana cult. sci. Ist. tech. agrar. Vercelli*, **2**, 1954, pp. 98, illus.

An account is given of the results of cultivation trials at Vercelli, N.E. of Turin, and 14 other sub-stations from 1933–42 and at the Campi-vivaio-orti botanici at Vercelli, Oropa di Biella and Varallo Sesia from the end of the war till 1953, with numerous drug and aromatic plant species. Notes are given of soil or particular climatic features at each centre and are followed by information on the success or lack of success of individual plants.

1663. París, R.
Nueva orientación de la fitoterapia. **(New outlook of herbal therapy.)**
*Farmacognosia*, 1956, **16**: 229-38.

A review is given of recent studies on plants yielding curare or sarmentogenin (mainly *Strophanthus* spp.) and on selection in *Digitalis*, *Rheum palmatum*, fungi producing antibiotics and alkaloids, and in alkaloid-yielding species of *Atropa*, *Nicotiana*, *Datura*, *Lobelia*, *Cinchona* and *Aconitum*.

1664. París, R.
Algunas plantas con alcaloides recientemente utilizadas en terapéutica (*Rauwolfia*, *Veratrum*, *Holarrhena*, etc.). **(Some plants containing alkaloids recently used in medicine (*Rauwolfia*, *Veratrum*, *Holarrhena*, etc.).)**
*Farmacognosia*, 1956, **16**: 239-53.

Details are given of alkaloids obtained from *Veratrum album*, *V. viride*, *Holarrhena floribunda*, *H. antidisenterica*, *Rauwolfia serpentina* and *Vinca* spp.

1665. Elzenga, G., and de Bruyn, J. W.
**Interrelation of alkaloid content and stage of development of 1- and 2-year-old *Atropa belladonna* L.** [Dutch summary 5 lines.]
*Euphytica*, 1956, **5**: 259-66, bibl. 10.

In 1-year-old plants maximum alkaloid content was reached during or just after flowering when the plant was bearing a few green berries. In 2-year-old plants maximum content was reached at a very early stage; it dropped to a low level during flowering and reached a peak again when the plants were bearing numerous green berries.—Inst. hort. Plant Breed., Wageningen.

1666. Elzenga, G., Smeets, L., and de Bruyn, J. W.
**Influence of the temperature on growth and alkaloid content of first-year *Atropa belladonna* L.** [Dutch summary ¼ p.]
*Euphytica*, 1956, **5**: 276-80, bibl. 4.

Plant development and alkaloid content were higher at 23° C. than at 26° or 20° C. Temperature had little or no effect on plant height or weight of dry matter at a given developmental stage.—Inst. hort. Plant Breed., Wageningen.

1667. Hawley, W. O.
**Hot-water treatment for the control of root-knot nematodes on *Dioscorea floribunda*.**
*Plant Dis. Reptr*, 1956, **40**: 1045-6, bibl. 1, illus.

Finger-sized roots of *Dioscorea floribunda*, heavily infested with *Meloidogyne* spp., were immersed in hot water at 51° C. for 30 minutes. Treatment markedly reduced nematode infection. The treated roots produced healthy vigorous shoots except in cases where the roots were nearly dead before treatment.—Agric. Res. Serv., U.S.D.A.

1668. Rao, A. S.
**A revision of *Rauvolfia* with particular reference to the American species.**
*Ann. Mo. bot. Gdn*, 1956, **43**: 253-354, bibl. extensive in text, illus.

In addition to material from tropical America the author has examined specimens from other continents. As a result he has reduced Pichon's 14 sections to 9, of which 2 are represented in America. The latter include 34 species, grouped under 4 series and 3 sub-series. Each of these species is described in detail, and short accounts are given of the history of the genus, its morphology and anatomy, variability within, and hybridization between, species, the uses to which

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permanganate, mercurous chloride plus sodium chloride, formalin, sodium chloride, potassium sulphate, carbon bisulphide, fermate, Shirlan W.S., Cuprox, calcium cyanamide, potassium dichromate, Dithane Z78, Dithane D14, copper sulphate or CBP (chlorobromopropene). Some cultural preventive measures are suggested.—Cawthron Inst., Nelson. J.R.L.

1684. VERZELE, M.
**Hop analysis.** [French, Spanish and German summaries 1 p. each.]
*Wallerstein Lab. Commun.*, 1956, **19**: 323-43, bibl. 14.

Determination of the *alpha*-acid (humulon, cohumulon and adhumulon) provides a satisfactory method of evaluating hops, whereas the *beta*-acid (lupulon, colupulon and adlupulon) has little influence on the bitterness of beer. The method of sampling may have an appreciable effect on the results of analysis. The top and bottom cones of the same plant do not have the same *alpha*-acid content, and, if the cones are not mixed before baling, samples from different parts of the same bale may show differences as high as 15%. The various methods available for determining *alpha*-acid are described and discussed in detail. The most precise method is considered to be the chromatographic-polarimetric method, as recently modified and simplified.

1685. HARRIS, J. O.
**Rapid method of hop analysis.**
*J. Inst. Brew.*, 1956, **62**: 468-9.

After extraction with petroleum ether, the resins are dissolved in methanol and aliquots of the solution are used (a) for direct gravimetric determination of total resins, and (b) for polarimetric determination of "humulones" after decolorization by percolation through charcoal. The results accord closely with those obtained by the Ford and Tait method. [Author's abstract.]—Newcastle Breweries Ltd., Newcastle-upon-Tyne.

### *Insecticidal plants.*

(*See also* 1701n.)

1686. SPICKETT, R. G. W.
**The chemistry of some lesser known insecticides of plant origin.**
*Colon. Plant Anim. Prod.*, 1955 (issued 1956), **5**: 288-304, bibl. 75.

This review covers rotenone and allied substances from *Mundulea suberosa*, *Millettia* spp., *Dolichos pseudopachyrrhizus*, *Ostryoderris* and *Pachyrrhizus* spp., and toxic substances (including alkaloids) from *Annona* spp., *Ryania* spp., *Tripterygium wilfordii*, *Halophyton cimicidium*, *Schoenocaulum* sp., *Helipsis* spp. and *Phellodendron* spp.

1687. JACOBSON, M.
**Constituents of *Heliopsis* species. V. Heliopsin, a second insecticidal amide from the roots of *H. helianthoides* var. *scabra*.**
*J. Amer. chem. Soc.*, 1957, **79**: 356-8, bibl. 5.

Information is given on the chemistry of heliopsin, an unsaturated isobutylamide closely related to scabrin [see *H.A.*, 21: 2832 l], which has been isolated from the roots of *H. helianthoides* var. *scabra* (formerly *H. scabra*). It has proved as toxic as pyrethrins to house flies.—Agric. Res. Serv., U.S.D.A., Beltsville, Md.

1688. DELHAYE, R. J.
Note préliminaire sur la biologie florale et sur la fécondation dirigée du pyrèthre, *Chrysanthemum cinerariaefolium* (Trev.) Bocc. **(Preliminary note on floral biology and controlled fertilization of pyrethrum.)** [Flemish summary 2 pp.]
*Bull. agric. Congo belge*, 1956, **47**: 1327-43, illus.

The best time for pollination was 10–11 a.m. in sunny weather. Artificial application of pollen to an emasculated inflorescence on 3 consecutive days gave rise to fewer seeds with a higher germinating capacity than arose from natural pollination. Without bees or other insects the percentage of fertile seed produced by self- and cross-pollination was much lower than when bees were admitted. Self-pollination was most successful when carried out with very small feather brushes, whereas forceps holding a few florets were better for crossing.—Stat. Rech. agron. INÉAC, Mulungu.

### *Rubber plants.*

(*See also* 1701q.)

1689. KALANTYR', M. S.
**Accumulation of gutta percha in *Eucommia* in different geographical regions.** [Russian.]
*Agrobiologija*, 1956, No. 4, pp. 115-19, illus.

A comparison between the gutta percha contents of *Eucommia* growing in China and the contents of plants grown in different regions in the Soviet Union showed that under similar ecological conditions accumulation was similar. Reduced air and soil moisture increased accumulation in the leaves, but in a damp climate conducive to vigorous growth the final yields were higher.

1690. EMPARAN, P. R., AND TYSDAL, H. M.
**The effect of light and other factors on breaking the dormancy of guayule seed.**
*Agron. J.*, 1957, **49**: 15-19, bibl. 8.

Freshly harvested achenes of guayule (*Parthenium argentatum*) germinated rapidly after treatment with 0·75% sodium hypochlorite and exposure to direct sunlight for 3–4 days, whereas dormancy in this species normally lasts 8–12 weeks. The longer the light exposure, up to the maximal 4 days used in the test, the higher the percentage germination of achenes stored from 0 to 56 days after harvesting. Light filtered through cotton cloth was less effective than direct sunlight. With achenes stored for 56 days sodium hypochlorite was as effective at 0·5% as at 0·75%. Germination was markedly reduced at temperatures above and below the 32°–15° C. range, the optimal range being 30°–20° C. The combined effects of light and oxidizing agent on fresh achenes did not counteract the effect of adverse temperature. Exposure to light had no significant effect on germination when the natural dormancy had ended.—Agric. Res. Serv., U.S.D.A.

1691. Pontovič, V. Ě.
**The effect of carbon dioxide on the activity of oxidising enzymes in the roots of kok-saghyz during post-harvest storage.** [Russian.]
*Trud. Inst. Fiziol. Rast. Timiryazeva*, 1954, **8**(2): 194-214, bibl. 40 [received 1956].

The activity of polyphenoloxidase, peroxidase, "residual respiration" and intensity of total respiration were studied in kok-saghyz roots, which had been grown at different levels of nutrition and then stored, either immediately after harvest or after a short term of cold storage, in an atmosphere containing 0–28% $CO_2$ at 18–20° C.

### *Seed oils.*

(*See also* 1008, 1056.)

1692. Iyengar, K. G.
**Oilseed resources in Mysore. I. Introduced or cultivated oilseeds.**
Iyengar, K. G., and Sastry, K. S. K.
**II. Partly wild and wild.**
*Mysore agric. Cal. 1955*, 1956, pp. 91-3, 93-8.

Groundnut, castor and sesame are the major oil seeds grown. In part II short, interesting accounts are given of 34 oilseed species of possible or proved value in Mysore.

1693. Blaim, K.
Zawartość tokoferoli (Wit. E) w nasionach roślin oleistych. **(Tocopherol (vitamin E) content of oil seeds.)** [English summary 2½ lines.]
*Roczn. Nauk rol.*, 1956, **73**: 407-10, bibl. 8.

Including data on the seeds of *Brassica*, *Raphanus*, *Camelina*, *Crambe*, *Papaver*, *Glaucium*, *Glycine*, *Perilla*, *Helianthus*, *Cucurbita* and *Linum* species.

1694. Swaminathan, M. S., and Natarajan, A. T.
**Chromosome spreading induced by vegetable oils.**
*Stain Tech.*, 1957, **32**: 43-5, bibl. 2, illus.

A technique is described which aids the separation and clarification of chromosomes in the root tips of seedlings. The method, which has been applied successfully to wheat, rice, broad beans and tobacco, involves soaking the seeds for 2 hours in a vegetable oil before germinating them in petri dishes. Among oils tested the best results were obtained with castor oil, but other oils, including coconut and sesame, have also been used for the purpose.—Indian agric. Res. Inst., New Delhi.

1695. Acosta y Lara, G.
Valor industrial de *Cynara cardunculus* (cardo de Castilla). **(The industrial value of the cardoon.)** [English summary 5 lines.]
*Rev. Asoc. Ingen. agron. Montevideo*, 1956, **25**: 3–25, illus.

The seeds of cardoon, which grows wild in Uruguay, are a valuable source of edible oil, and the stems and pappi provide alpha cellulose. Analytical and yield data are presented and compared with those for sunflower. It is suggested that the plant should be grown commercially. Its advantages are that it is perennial, it enters into production 10 months from sowing, it is tolerant of poor soil, drought and intense heat, it is highly resistant to pests and diseases, and the capituli mature evenly.

1696. Schuster, M. L.
**Investigations on the foot and root phase of safflower rust.**
*Phytopathology*, 1956, **46**: 591-5, bibl. 6, illus.

Soil temperature affected the pathogenicity of soil- or seed-borne inocula of the safflower rust pathogen, *Puccinia carthami*, but soil moisture appeared to have little effect on the amount of rust. Variability in *P. carthami* was indicated but was not definitely determined, and there were also varietal differences in reaction to infection. Seed treatment and side dressings of seed did not prevent infection by soil-borne inocula. Actidione at 250 or 1,000 p.p.m. caused a reduction in seedling emergence but protected those which did emerge from infection.—Univ. Nebraska, Lincoln.

### *Sundry plants.*

(*See also* 1701f-h, j, k, 2004.)

1697. Ramadan, D.
**A note on the nutritive value of *Acacia cyanophylla* seeds.**
*Emp. J. exp. Agric.*, 1957, **25**: 37-9, bibl. 2.

The seeds of *Acacia cyanophylla* contain about 30% crude protein. Feeding trials on chicks have shown their "gross protein value" to be similar to that of groundnut meal.—Dep. Agric., Cyprus.

1698. Trippett, S.
**Toxic constituents of the Australian finger cherry, *Rhodomyrtus macrocarpa* Benth.**
*J. chem. Soc. Lond.*, 1957, pp. 414-19, bibl. 5.

Rhodomyrtoxin, the toxic constituent of the immature Australian finger cherry, has been isolated and shown to be a tetrahydroxydimethyl-di*iso*valeryldibenzofuran. [Author's abstract.]—Univs. Cambridge and Leeds.

1699. Manganelli Ranieri, A.
Accrescimento in spessore del fusto di *Schinus molle* L. a Bari. **(Secondary thickening in the trunk of *Schinus molle* at Bari.)** [English summary 1 p.]
*Nuovo G. bot. ital.*, 1953, **60**: 579-91, bibl. 13, illus. [received 1957].

This resin-yielding species, naturalized in Italy from Peru, showed no complete cessation of cambial activity, but in 1952 the male tree produced 4 and the female tree 3 layers of wood. Such growth rhythm is comparable with that in fig and olive trees, but differs from that of most Mediterranean evergreens, in which a short cambial rest occurs in summer and a longer one in winter.

1700. Booth, E.
**A method of drying seaweed using a steam-heated drum dryer.**
*J. Sci. Food Agric.*, 1956, **7**: 705-10, bibl. 7.

A new method has been developed in which fresh seaweed is milled and the resultant pulp sun-dried. Various brown seaweeds have been dried and costs of production estimated.—Inst. Seaweed Res., Inveresk.

*Noted.*

1701.

a ABRAHAM, P.
**Spices as intercrops in coconut and arecanut gardens.**
*Arecanut J.*, 1956, **7**: 56-8.
Pepper, cardamom, ginger and turmeric.

b ANDREWS, A. C.
**Sage as a condiment in the Graeco-Roman era.**
*Econ. Bot.*, 1956, **10**: 263-6, bibl. 37.
Several *Salvia* spp. were used.

c BAL, S. N., AND GUPTA, B.
**Morphology of roots of *Aristolochia indica* Linn.**
*Sci. and Cult.*, 1956, **22**: 276-7, bibl. 2, illus.
Roots and rhizomes yield the drug aristolochia.

d BROWN, E. G.
**Cinnamon and cassia: sources, production and trade. Part 1. Cinnamon.**
*Colon. Plant Anim. Prod.*, 1955 (issued 1956), **5**: 257-80, bibl. 36.
Culture and oils of *Cinnamonum* spp.; a review.

e BU'LOCK, J. D.
**Acetylenic compounds as natural products.**
*Quart. Rev. chem. Soc. Lond.*, 1956, **10**: 371-94, bibl. 102.
In seed fats of certain angiosperms and in essential oils.

f COCKER, J. D., HALSALL, T. G., AND BOWERS, A.
**The chemistry of gum labdanum. Part I. Some acidic constituents.**
COCKER, J. D., AND HALSALL, T. G.
**Idem. Part II. The structure of labdanolic acid.**
*J. chem. Soc. Lond.*, 1956, pp. 4259-62, bibl. 12, and pp. 4262-71, bibl. 13.
Based on commercial samples obtained from *Cistus ladaniferus*.

g CORTI, R.
Sughere a maturazione biennale della ghianda in Puglia. **(Cork oaks in Apulia with acorns taking two years to mature.)** [English summary 5 lines.]
*Nuovo G. bot. ital.*, 1953, **60**: 686-8, bibl. 12 [received 1957].
Certain trees of *Quercus suber* differing from typical members of the species.

h EICHHOLZ, W.
Die generative Vermehrung des Sanddorns. **(Propagation of sea-buckthorn from seed.)**
*Dtsch. Baumsch.*, 1957, **9**: 1-7, bibl. 8, illus.
Problems reviewed.

i FERREYRA H., R.
El curare en el valle del Huallaga. **(Curare in the Huallaga valley.)**
*Inf. mens. Estac. exp. agríc. La Molina*, 1956, **30**(345): 9-16, bibl. 6, illus.
*Chondodendron tomentosum* and the preparation of curare described.

j FULLING, E. H.
**Botanical aspects of the paper-pulp and tanning industries in the United States—an economic and historical survey.**
*Amer. J. Bot.*, 1956, **43**: 621-34, bibl. 39.
With lists of plant sources.

k HAMILTON, J. K., SPRIESTERSBACH, D. R., AND SMITH, F.
**The structure of chagual gum. I. Composition of the gum and isolation of 2-*O*-(D-glucopyranosiduronic acid)-D-xylose.**
*J. Amer. chem. Soc.*, 1957, **79**: 443-6, bibl. 18.
Obtained from *Puya chilensis* and other *Puya* spp.

l HOWARD, G. A.
**The configuration of humulones.**
*Chem. Ind. Lond.*, 1956, No. 50, p. 1504, bibl. 3.

m MARY, N. Y.
**Studies on official species of aloe.**
*Diss. Abstr.*, 1956, **16**: 971, being *Publ.* 14,476 of 107 pp.
Pharmacological studies on aloe, aloin and cascara sagrada bark.

n MOORE, B. P.
**Notes on the 2:4-dinitrophenylhydrazine method for pyrethrum assay.**
*J. Sci. Food Agric.*, 1956, **7**: 740-4, bibl. 8.

o MORTON, H. G., AND ALLISON, R. V.
**Progress report on the processing of ramie fiber for industrial use.**
*Proc. Soil Sci. Soc. Fla, 1955*, **15**: 60-7, bibl. 2, illus.
From harvesting to manufacture.

p PANINI, F.
Le piante officinali, aromatiche ed i frutti di sottobosco, prezioso ausilio al reintegro dell'economia montana. **(Medicinal and aromatic plants and woodland fruits, a valuable aid to reintegration of mountain economy.)** [English, French, Spanish and German summaries ⅛ p. each.]
*Riv. int. Agric.*, 1956, No. 6, pp. 27-31, illus.
Cultivation of chamomile and liquorice in Italy discussed.

q PROKOF'EV, A. A.
**Studies on the biosynthesis of rubber.** [Russian.]
*Trud. Inst. Fiziol. Rast. Timiryazeva*, 1954, **8**(2): 175-93, bibl. 38, illus.
In the roots of kok-saghyz.

r VERGUIN, J.
Vingt plantes médicinales du Bas-Mangoky (côte ouest de Madagascar). **(Twenty medicinal plants of lower Mangoky, west coast of Madagascar.)**
*J. Agric. trop. Bot. appl.*, 1956, **3**: 412-14.
Brief notes on species used in native medicine.

# FLORICULTURE.

## *General.*

(*See also* 1006, 1023, 1049, 1084 l, 1085m, 1384-1387, 1397, 1782d, i, m, s, v, w, 2000, 2008b, c.)

1702. Fischer, C. C., Widmoyer, F. B., and Watson, D. P.
**Effect of various wavelengths of light on selected ornamental plants.**
*Quart. Bull. Mich. agric. Exp. Stat.*, 1956, **39**: 259-62, bibl. 8.

Exposure to daily supplementary light of different wavelengths increased linear growth and decreased flower production in *Zinnia elegans* and *Chrysanthemum morifolium*, but red light only slightly reduced flowering in the latter plant. Linear growth and branching were reduced in *Euonymus vegetus* by coloured or white light supplements, red having the least effect on branching. In *Taxus media hicksii* red and yellow light slightly, and white and blue light very slightly, checked linear growth, which in *Juniperus chinensis columnaris* was increased by blue, green and particularly red light, while in *Spiraea vanhouttei* this effect was produced by green and white supplements and in *Pelargonium hortorum* by red. Flower production was increased in this last species by supplementary blue, red or white light.

1703. Wezenberg, H. J.
Stikstofvoeding van bloemisterijgewassen. **(Nitrogen nutrition of flower crops.)** [English summary 16 lines.]
*Meded. Dir. Tuinb.*, 1956, **19**: 691-5, bibl. 6.

Some practical results obtained from the application of N to flower crops are outlined. The main crops considered are roses, carnations, begonias and cyclamen under glass, and lilacs and hydrangeas as outdoor crops. —Proefst. Bloem., Aalsmeer.

1704. Basteleus, R.
L'art de cultiver les plantes sur un hydrovase. **(The art of growing plants in a hydrovase.)**
*Bull. hort. Liège*, 1956, **11**: 368-73, bibl. 2, illus.

A recent advance in the culture of house plants is described, in which the plant's root system is supported in an inner pot containing gravel, from which some roots emerge into an outer container holding a nutrient solution. A list of plants which have grown satisfactorily in these containers is given.—École Hort., La Hulpe.

1705. Huber, H.
Die Abhängigkeit der Nektarsekretion von Temperatur, Luft- und Bodenfeuchtigkeit. **(The relation of nectar secretion to temperature, air humidity and soil moisture.)**
*Planta*, 1956, **48**: 47-98, bibl. 106, illus.

The effects of environment on nectar secretion were studied in flowers of 9 ornamental species. In general, increase in temperature increased secretion of sugars, but there was no fixed optimum. Air humidity affected both quantity and quality of secreted nectar. Soil moisture had, in general, a marked effect on secretion. —Univ. Munich.

1706. Baker, K. F., and Sciaroni, R. H.
***Diseases of major floricultural crops in California.***
California State Florists' Association, 750 Wall St., Los Angeles 14, 1952, pp. 57 [received 1956].

Following an introductory section on the causes and control of plant diseases, details are given of the symptoms, cause and control of the main pathogenic and physiological diseases of the following crops: China aster, azalea, calendula, carnation, chrysanthemum, delphinium and larkspur, gardenia, gladiolus, heather, lily, orchids, rose, snapdragon, stock and sweet pea.—Univ. Calif., Los Angeles, and Calif. agric. Ext. Serv.

1707. Jung, J.
Sind Narbe und Griffel Eintrittspforten für Pilzinfektionen? **(Are the stigma and style points of entry for fungus infection?)**
*Phytopath. Z.*, 1956, **27**: 405-26, bibl. 35, illus.

Stigmata of 61 different ornamental plant species were artificially inoculated with various fungi and examined anatomically. No case of fungal growth down the style was observed.

1708. Tapio, E.
Koristekasvien härmän torjunnasta. **(The control of powdery mildew in ornamental plants.)** [English summary 11 lines.]
*Maatalous ja Koetoim.*, 1956, Part 10, pp. 123-30, bibl. 4, illus.

Karathane WD (dinitro 1-methyl heptyl phenyl crotonate), Tolu-soap (potassium soap, toluene and alkylsulphonate) and Albolineum Special (white oil emulsion) have proved fully efficient to cope with *Erysiphe* mildews on begonias and roses in Finland. The effect of Karathane was particularly lasting, but damage was done to begonia flowers. Albolineum and Tolu tended to increase sun scorch damage on begonia leaves. [From author's summary.]—Dep. Pl. Path., agric. Res. Centre, Tikkurila.

1709. Shanks, J. B.
**Prevention of *Rhizoctonia* stem rot in young plants.**
*Md Florists*, Oct. 1956, reprinted in *Flor. Exch.*, 1956, **127**(26): 12.

The most effective material tested for the protection of carnations, snapdragons and poinsettias against *Rhizoctonia solani* was Terraclor (PCNB). A–D–O (25% hydroxyquinoline sulphate) provided protection for up to 2 weeks. These treatments are not considered to be satisfactory substitutes for soil sterilization and good cultural practices.—Dep. Hort., Univ. Maryland.

1710. Altman, J., and Bachelder, S.
**Susceptibility of some ornamental and vegetable plants to streptomycin injury.**
*Plant Dis. Reptr*, 1956, **40**: 1081-3, bibl. 2.

Ivy, paperomia and capsicum were very tolerant, but pelargonium, sweet corn and bean var. Bountiful were sensitive to concentrations above 400 p.p.m.—Rutgers Univ., N.J.

1711. Schread, J. C.
**Systemic insecticides to control mealybug, scale, aphids, and cyclamen mite on ornamentals.**
*Circ. Conn. agric. Exp. Stat.* **200**, 1956, pp. 18, bibl. 4, illus.

Test during 1951–56 gave the following results: *Mealybugs:* One soil drench of Systox or Thimet gave good control of nephthytis. Two soil drenches of these compounds or experimental compound 12008 were effective on Chinese evergreen. Malathion spray controlled mealybugs on lemon. *Scale insects:* Systox soil treatments controlled soft brown scale (*Coccus hesperidum*) on nephthytis. Systox, Thimet and compound 12008 controlled euonymus scale on euonymus. *Aphids:* Thimet and compound G-22870 used as soil drenches gave complete control of aphids on chrysanthemum, as did Thimet and compound 12008 on geranium. *Cyclamen mite* (*Tarsonemus pallidus*): Two soil treatments with Systox, Thiuret or compound 12008 controlled the mite on velvet plant (*Gynura aurantiaca*) and ivy. Thiuret was more effective than Systox on kalanchoë and cyclamen. Endrin and Loro used as dips gave reasonably good control in the leaves of cyclamen plants but poor control in the flower buds.

1712. Junaid, A. H. M., and Nasir, M. M.
**Fumigation of cut-flowers, rose cuttings and preserved dates with methyl bromide.**
*Agric. Pakist.*, 1956, **6**(2): 80-103.

Experiments at Karachi in an 8 cu. ft. fumigation chamber, which are here described, led to the following conclusions: A dose of 16 mg. per litre of methyl bromide at atmospheric pressure and at temperatures of 85–87° F. for 1·5 hours appeared suitable for fumigating cut rose, tulip and carnation flowers against thrips (*Rhipiphorothrips cruentatus*). Methyl bromide at 32 mg./l. at atmospheric pressure and at 75°–77° F. for 2 hours was most suitable for treating rose cuttings against mealy bug (*Icerya* spp.). A dose of 35·5 mg./l. methyl bromide at atmospheric pressure and at 81°–84° F. for 1·5 hours appeared most suitable for fumigating dates against larvae of *Ephestia* spp. and adults and larvae of *Oryzaephilus* sp. Complete mortality was obtained by a dose of 12 mg./l. in a vacuum (≡10 cm. mercury) for 1·5 hours at 82° F. These treatments did not have any injurious effects.

### *Annual and herbaceous plants.*

(*See also* 1023, 1026, 1027, 1029, 1030, 1059, 1363, 1782r, t, 1783a-d, g, 1963, 1971.)

1713. Golubinskij, I. N.
**Atmospheric precipitation water as a medium for germinating pollen grains.** [Russian.]
*Doklady Akad. Nauk S.S.S.R.*, 1956, **109**: 1203-5, bibl. 1.

Pollen of *Primula obconica*, *P. officinalis* and *Lathyrus pratensis* germinated better in snow and rain water than in well or distilled water. Pollen of *Lathyrus pratensis* and *Primula obconica* was also germinated in dew collected from the leaves of several plant species. When dew from 9 species was used as media for *L. pratensis* pollen, 8 greatly stimulated germination and 1 retarded it. *P. obconica* pollen germinated well in dew from all 4 species tested.

1714. Bellartz, S.
Das Pollenschlauchwachstum nach arteigener und artfremder Bestäubung einiger Solanaceen und die Inhaltsstoffe ihres Pollens und ihrer Griffel. **(Pollen tube growth after pollination by the same or different species of some Solanaceae and the composition of their pollen and styles.)**
*Planta*, 1956, **47**: 588-612, bibl. 74.

The species studied chiefly were *Nicotiana tabacum*, *Salpiglossis sinuata* and *Petunia hybrida*. *Petunia* pollen on other solanaceous styles developed well, but growth of pollen from different species on *Petunia* styles was negligible. On styles of *Salpiglossis* and *Nicotiana* pollen from other solanaceous species grew tubes down to the ovary, but pollen from species of a different family did not grow.—Bot. Inst., Univ. Cologne.

1715. Mastalerz, J. W.
**Storage of carnation cuttings at 31° F.**
*Pa Flower Grs*, Nov. 1956, reprinted in *Flor. Exch.*, 1956, **127**(23): 11, 55.

Successful and profitable storage of carnation cuttings requires high quality cuttings, a temperature of 31° F., and moisture-proof containers. Cuttings have been stored for up to 6 months. The most popular storage containers in New England are wooden or sheet metal boxes lined with polyethylene. Both rooted and unrooted cuttings have been successfully stored.—Pa St. Univ.

1716. Puccini, G.
Influenza dei sali di potassio sullo sviluppo del garofano rifiorente della Riviera. **(The influence of potassium salts on the development of perpetual flowering carnations on the Riviera.)** [English summary ¾ p.]
*Ann. Sper. agrar.*, 1956, **10**: 2071-80, bibl. 1.

The plots received 0, 45 or 90 g. per sq. m. of potassium salt, either chloride or sulphate, before planting. The average number of flowers per plant was 5·56 without K. This rose to 6·25 and 6·73 at the medium and to 6·34 and 7·0 at the high rate of K, sulphate being superior to chloride at both rates. Uptake of Si increased proportionately to the K supply, resulting in stronger and slightly shorter stems. Trace elements found in both soil and plants were Fe, Mn, B and Al. In addition the plants contained Li and Mo [see also *H.A.*, 27: 680].

1717. Bestagno, G., and Santocchia, A.
Disinfestazione con bromuro di metile in sistema Gasconserv di fiori di garofano infestati da *Cacoecia pronubana* Hüb. **(Methyl bromide disinfestation in Gasconserv apparatus of carnation flowers infested by *Cacoecia pronubana*.** [English summary 11 lines.]
*Riv. Ortoflorofruttic. ital.*, 1956, **40**: 494-502, bibl. 17, illus.

Larvae of *Cacoecia pronubana* were completely exterminated in baskets of carnations packed for export and treated with an atmosphere containing 20 g. of methyl bromide per cu.m. for 4 hours at normal pressure. Even at this low concentration, however, there were various degrees of damage to blooms, those of pale colour being generally most affected.

1718. Riehl, G.
**Wuchsstoffanwendung je nach der Anzuchtbedingung vorteilhaft, ergebnislos oder nachteilig. (The beneficial, negligible or injurious effects of growth substance applications in relation to environmental conditions.)**
*Dtsch. Gartenb.*, 1956, **3**: 287-91, bibl. 8, illus.

Success in the application of growth substances to improve rooting in cuttings depends on optimal environmental conditions. In support of this statement data are cited showing the effect of temperature and moisture on the rooting of chrysanthemum cuttings treated with the preparation P604 [chemical compound not stated]. At 20–25° C., for instance, results were much better than at lower temperatures, and lower levels of moisture in the medium induced better rooting than higher levels. If suitable conditions are not observed growth substance treatment may have deleterious effects.—Humboldt Univ., Berlin.

1719. Holmes, F. O.
**Elimination of aspermy virus from the Nightingale chrysanthemum.**
*Phytopathology*, 1956, **46**: 599-600, bibl. 6.

The Nightingale chrysanthemum, which was formerly only available as a carrier of tomato-aspermy virus and a mosaic-type virus, has been freed from the former by the propagation of scions cut from extreme tips of branches. The scions were grafted on to healthy plants of the Good News variety.—Rockefeller Inst. med. Res., N.Y.

1720. Procenko, A. E., and Kuznecova, A. K.
**Protection of plants from yellows.** [Russian.]
*Sad i Ogorod*, 1956, No. 12, p. 73, illus.

A virus disease, similar to aster yellows, was observed on many flower crops and weeds. In frame grown cinerarias the virus was found to be transmitted from diseased dandelions and plantains by cicadas. For control the early destruction of infected weeds, the erection of 1·5 m. tall muslin screens and dusting with DDT or other insecticides are recommended.

1721. Ackerman, C. E.
**The genetics and physiology of foliar dieback in the greenhouse snapdragon, *Antirrhinum majus* L.**
*Diss. Abstr.*, 1956, **16**: 1034, being *Publ.* 16,739 of 63 pp.

The effect of variations in light and temperature conditions upon the incidence of foliar dieback in greenhouse snapdragon was studied with several varieties. Foliar dieback consistently occurred in the entire sample population of an isolated strain of Lady Dorothy, whenever it was exposed to an air temperature of 40° F. or lower for 8 hours. The $F_2$ progenies of several crosses, of which the isolated strain of Lady Dorothy was a parent, showed dieback symptoms in the ratio of 3 normal : 1 dieback when exposed to a 40° F. air temperature for 8 hours. The nature of the response of susceptible genotypes indicates the expression of a single recessive gene under the influence of a low air temperature.—Mich. St. Univ.

1722. Jacks, H., and Webb, A. J.
**Glasshouse tests for control of antirrhinum rust.**
*N.Z. J. Sci. Tech., Sect. A*, 1956, **38**: 309-11, bibl. 2.

The most effective compounds for control of antirrhinum rust (*Puccinia antirrhini*) under glass were zineb, wettable sulphur, ferbam, maneb, dichlone, thiram, colloidal sulphur, and lime sulphur plus colloidal sulphur. [Authors' summary.]—Plant Dis. Div., D.S.I.R., Auckland.

1723. Miller, P. M.
**An experimental study of variability in a wild population of violets.**
*Diss. Abstr.*, 1956, **16**: 1568-9, being *Publ.* 17,253 of 71 pp.

A population of wild stemless blue violets, comprising *Viola sagittata*, *V. papilionacea* and their hybrids, was studied to determine the causes of extreme variability found in the population. From observations in field and greenhouse it was shown that leaf shape and pubescence varied according to environmental conditions. Leaf shape in *V. sagittata* and hybrids similar to it, but not in *V. papilionacea*, was affected by day length. This variation was assumed to be of genetic origin.—Univ. Pennsylvania.

### *Bulbs, tubers, etc.*

(*See also* 1084j, 1782b, e, f.)

1724. Mulder, D. P. J.
Stikstofbemesting in de bloembollenteelt. (**Nitrogen manuring in bulb growing.**) [English summary ¼ p.]
*Meded. Dir. Tuinb.*, 1956, **19**: 706-15, illus.

In the dune sand soils of the bulb district, nutrients are quickly leached, so that split applications give the best results. The tulip Krelage's Triumph was shown to grow most between the beginning of March and mid-May, and N applications were most satisfactory when part was given in November/December and part in February/March. Results with organic manures have been variable. Silt compost gave better results with the gladiolus Snow Princess than did farmyard manure, but with hyacinths, and to a lesser extent tulips, the opposite effect was obtained. Tulips required per $RR^2$ [14·19 sq. m.] about 1–1¼ kg. of sulphate of ammonia or of nitrate of lime and ammonia divided into a winter and one or 2 spring applications. Hyacinths needed rather more N in the spring. Bulbs, which received ample N during growth forced better than bulbs produced with insufficient N. Hyacinths receiving ample N produced more fasciated stems than normal.—Rijkstuinbouwconsulentschap, Lisse.

1725. Slootweg, A. F. G.
**Rootrot of bulbs caused by *Pratylenchus* and *Hoplolaimus* spp.**
*Nematologica*, 1956, **1**: 192-201, bibl. 10, illus.

Root rot caused by nematodes is widespread in Holland on bulbs and corms. The primary cause of the rot is *Pratylenchus penetrans*, with *Cylindrocarpon radicicola* in a secondary role. In bulbs root rot is restricted to the roots, thus it is not bulb-transmitted if the roots

are well dried. Shell DD was found to be the most satisfactory soil fumigant, and narcissus growth was stimulated by this treatment. The growing of African marigolds on infected soil considerably reduced the *Pratylenchus* population.—Lab. Bulb. Res., Lisse.

1726. VAN DEN BRANDE, J., KIPS, R. H., AND D'HERDE, J. D.
Doding van *Heterodera rostochiensis*—Cysten op Begonia- en Gloxinia-Knollen. **(The control of *Heterodera rostochiensis* cysts on begonia and gloxinia corms.)**
*Meded. LandbHogesch. Gent*, 1955, **20**: 271-8, from abstr. in *Z. PflKrankh.*, 1956, **63**: 675.

Good nematode control without plant injury was obtained by treatment with 0·05% and 0·025% CBP emulsion (20, 40 or 60 min. and 40 or 60 min. respectively) and with 0·5% formaldehyde (60 min.) heated to 43° C.

1727. FLUKE, C. L.
**Do systematic insecticides have a place in the control of dahlia insects?**
*Wis. Hort.*, 1957, **17**: 155.

Thimet (3911), Systox and American Cyanamid's No. 12008 proved unsuccessful against dahlia mites and insects in the greenhouse and outside in a muck-soil plot.

1728. MAATSCH, R.
Tontopf oder Topfballen zur Frühkultur von Gladiolen. **(Pot or seed box culture of early gladioli.)**
*Gartenwelt*, 1956, **56**: 386-7, illus.

Raising gladioli in seed boxes instead of clay pots to reduce labour cost yielded a normal crop but delayed flowering by 5–7 days.—Inst. Zierpflanzenb., tech. Hochsch., Hannover.

1729. KOSUGI, K., AND SUMITOMO, M.
**Studies on blindness in gladiolus. III. On the response of gladiolus varieties to temperature and light.** [Japanese, with English summary ⅓ p.]
*Tech. Bull. Kagawa agric. Coll.*, 1956, **7**: 113-22, bibl. 15.

In experiments designed to find a variety of gladiolus for winter flowering Atom, Hector, Scarlet Princeps and Spic and Span proved relatively insensitive to low temperatures and reduced light intensity and duration. Birch Red and the autumn flowering variety Nissen were most sensitive to low temperatures and reduced light. Some varieties were more affected by reduced light than by low temperature but others were more sensitive to temperature changes. J.R.L.

1730. ADAMS, D. F., SHAW, C. G., AND YERKES, W. D., JR.
**Relationship of injury indexes and fumigation fluoride levels.**
*Phytopathology*, 1956, **46**: 587-91, bibl. 10, illus.

Fumigation of 2 varieties of gladiolus, Ethel Cave Cole and Snow Princess, at 3 fumigation levels for different exposure times indicated a direct relationship between the fumigation exposure factors and the foliar injury produced. The data also indicated that Ethel Cave Cole was slightly more sensitive to hydrogen fluoride than was Snow Princess. The statistical relationships between injury indexes and exposure factors were in excess of that required for confidence at 1% level. [From author's summary.]—St. Coll. Wash., Pullman. [See also *H.A.*, 26: 2348.]

1731. MCCLELLAN, W. D., AND PRYOR, R. L.
**Susceptibility of gladiolus varieties to *Fusarium, Botrytis,* and *Curvularia.***
*Plant Dis. Reptr*, 1957, **41**: 47-50.

In 1955 corms of 142 gladiolus varieties were tested for resistance to *Fusarium oxysporum* f. *gladioli* and in 1956 46 varieties were tested for resistance to *Fusarium*, *Botrytis* and *Curvularia*. It was found that only Catherine Beath, Kerry Dancer and Sierra Snow showed much resistance to *Fusarium* and in both years many varieties were very susceptible. Few plants of Elizabeth the Queen, Florence Nightingale, Friendship, Little Gold, Orchid Frills, Pink Diamond, Salmon's Sensation, South Belle, Spic and Span, Sweet Sixteen, Wedgewood and Wild Rose became infected with *Botrytis* but nine varieties including Kerry Dancer were very susceptible. Only four varieties had a low disease rating for *Curvularia*, namely, Friendship, Gene, Spic and Span and Sweet Sixteen, and ten varieties were very susceptible. Resistance to all three diseases is controlled by different genes.—U.S.D.A., Beltsville, Md. J.R.L.

1732. JEFFERSON, R. N., AND OTHERS.
**Effect of Vapam on *Rhizoglyphus* mites and gladiolus soil diseases.**
*J. econ. Ent.*, 1956, **49**: 584-9, bibl. 9, illus.

In soil heavily infested with *Rhizoglyphus* mites and 3 gladiolus soil diseases, fumigation with Vapam increased the yields of flowers and corms, reduced the mite infestation, and reduced infection from bacterial scab, *Pseudomonas marginata*, from *Fusarium oxysporum* f. *gladioli* and probably from *Stromatinia gladioli*. For the varieties tested, higher dosages were required for significant increases in corm yields from corm planting stock than from cormel planting stock. Dipping the planting stock in New Improved Ceresan resulted in irregularities in the effects resulting from increased dosages of Vapam on bacterial scab. New Improved Ceresan may upset the balance between a pathogen and antagonists derived from the planting stock and the soil. No such effect on *Fusarium* disease was observed. [From authors' summary.]—Univ. Calif., Los Angeles. [See also *H.A.*, 27: 702.]

1733. MCCLELLAN, W. D.
**A corm rot of gladiolus caused by *Rhizopus arrhizus*.**
*Phytopathology*, 1956, **46**: 687-9, bibl. 5, illus.

Freshly harvested corms heat-treated at 85° F., and particularly at 95° F. were liable to infection by *Rhizopus arrhizus*, which produced a light brown soft rot. The incidence was increased by injury and by damp storage conditions. Varietal susceptibility decreased in the order: Picardy, October Sunshine, Spotlight, Chamouny, and Spic and Span.—U.S.D.A., Beltsville, Md.

1734. Tsukamoto, Y., and Fujioka, S.
**Studies on fertilizers for florist crops. I. Fertilizers for amaryllis.** [Japanese, with English summary ⅓ p.]
*J. hort. Ass. Japan*, 1956, **25**: 208-12, bibl. 12.

Four levels of N, P and K were applied in solution to bulblets of *Hippeastrum hybridum* to determine the best fertilizer treatment for bulb production. The best results were obtained with either 300 p.p.m. each of N, P and K, or 225 p.p.m. N, 150 p.p.m. P and 300 p.p.m. K. Potassium did not increase top weight but it did improve bulb division, High K levels were not conducive to good plant growth except at high levels. Plants given high rates of N and K absorbed more N and K respectively than plants given low rates. This was not the case with P.

1735. Winstead, N. N., Jenkins, J. M., Jr., and Haasis, F. A.
**Reaction of Dutch iris varieties to *Puccinia iridis* in North Carolina.**
*Plant Dis. Reptr*, 1956, **40**: 1112-14, bibl. 2, illus.

Of 46 varieties tested, Golden Show and Goudstuk appeared to be immune, and Early Blue, Gold and Silver, Golden West, Imperator, Lemon Queen and Texas Gold were highly resistant.

1736. Sagawa, Y.
**The production of polyploid forms in the Easter lily, *Lilium longiflorum* variety *giganteum* Hort., with special reference to triploids.**
*Diss. Abstr.*, 1956, **16**: 1564-5, being *Publ.* 18,338 of 146 pp.

The diploid plants of *Lilium longiflorum* var. *gigantea* used as parents in this study were the clones Croft, Creole, Estate and 2 seedlings LWQAustr38 and USDA44. The diploids were found to be self-incompatible and generally cross-compatible. Many tetraploids were produced by intercrossing and subsequent selfing of the progeny of 2 colchicine-induced tetraploids. From 853 reciprocal crosses made between diploids and tetraploids, 2 triploids were produced, only one of which grew normally. A previously produced colchicine-induced polyploid has proved to be a chimaera, and its composition is discussed.—Univ. Connecticut.

1737. Ueno, K., and Kawaguchi, T.
**An experiment on the growth and propagation of *Lilium speciosum* bulbs.** [Japanese, with English summary 7 lines.]
*Bull. Kanagawa agric. Exp. Stat. hort. Sect.*, 1956, No. 4, pp. 89-93, bibl. 4, illus.

*Lilium speciosum* var. Uchida Kanoko bulbs (ranging from 3–8 in. in diameter) and bulblets (ranging from 2·5–20 g. in weight) were compared as planting material, and it was found that the size and nature of the shoots produced varied according to the size of bulb or bulblet. Bulbs of more than 7 in. in diameter produced a high percentage of double nosed bulbs. It is concluded that it is most economical to plant 5-g. bulblets.

J.R.L.

1738. Reimann-Philipp, R.
Die Erzeugung polyploider Formen von *Convallaria majalis* sowie einige Beobachtungen über die Wirkung der Maiblumenglykoside auf die Mitose. **(The production of polyploid forms of *Convallaria majalis* and observations on the action of lily-of-the-valley glycosides on mitosis.)**
*Z. Pflanzenz.*, 1956, **36**: 289-304, bibl. 12, illus.

A successful method of treating lily-of-the-valley pips with colchicine is described. The maintenance of mixoploidy in the root tips of treated plants is attributed to the action of the glycosides convallarin, convallatoxin and convallamarin.—Inst. Vererbungs-u. Züchtungsforsch., Berlin-Dahlem and Inst. gärtn. PflZücht., Hannover.

1739. Maatsch, R., and von Hentig, W.-U.
Warmwasserbehandlung und Beizung von Maiblumen zur Frühtreiberei. **(Hot-water treatment and disinfection of lily-of-the-valley pips.)**
*Gartenwelt*, 1956, **56**: 369-70, bibl. 2, illus.

Two years' experiments have shown that the hot-water treatment of lily-of-the-valley pips can be successfully replaced by immersion for 5 hours in a 0·1% solution of the mercurial fungicide Germisan at room temperature. The effect of the hot-water treatment was also improved by the addition of 0·025%–0·1% Germisan to the water.

1740. Harrison, I. R.
**Control of bulb scale mite in narcissus.**
*Plant Path.*, 1956, **5**: 127-9.

Preliminary experiments have indicated that the flower production of bulbs infested with *Tarsonemus laticeps* may be improved by applying the systemic insecticides fluoracetanilide, schradan or amiton 3–4 weeks before flowers appear. These insecticides have also shown promise when used as dips before planting. Suitable dosages have not yet been established.—Plant Path. Lab., Harpenden, Herts.

1741. Durbin, R. D.
**Hot-water seed treatment for control of a root rot complex of *Strelitzia reginae*.**
*Plant Dis. Reptr*, 1956, **40**: 1116, bibl. 1, illus.

Variability in germination percentage of *Strelitzia* seed is due to a fungus complex, involving an internally-borne *Fusarium* sp., which rots the seed and roots. In an attempt to eradicate the fungus the seed was soaked in water at room temperature for 1 day and then immersed in hot water at temperatures ranging from 115° to 140° F. for 30 minutes. The best result, 78% germination compared with 12% in the controls, was obtained by treatment at 135° F. Treatment at 140° F. was injurious.—Univ. Calif., Los Angeles.

### *Lawns.*

(*See also* 1393-1396, 1782o, q, 1783f.)

1742. Lunt, O. R. Miller, P. A., and Wyckoff, C. G.
**Seedbed preparation for turfgrass.**
*Golf Course Reptr*, 1955, 23(6): 5-9, from abstr. in *Biol. Abstr. Sect. D*, 1956, **30**, No. 29587.

Investigations were conducted to determine if certain treatments would aid in obtaining a desirable stand of weed-free grass. Soil amendments used were manure, Flotal (an aggregating agent containing ferric ammonium alum with about 12% peat as a carrier), and Flotal plus fertilizer. These treatments were combined factorially with three fumigants—formaldehyde, chloropicrin, and methyl bromide. The quality of turf grass was improved by the aggregating agent. With this material, the density of the roots at a depth of 4–6 in. was increased, the density of the stand appeared to be greater, and the friability of the soil was obviously improved. At the rate used (25 lb./100 sq. ft.) manure did not noticeably improve the tilth of the soil. Fumigation treatments in general reduced the weed population but did not effectively control it. A marked and highly significant stimulation in growth resulted from the use of formaldehyde and chlorpicrin. The reasons for this reaction were not readily apparent.—Univ. Calif., Los Angeles.

1743. During, C.
**Importance of soil acidity in maintenance of fine turf.**
*N.Z. J. Agric.*, 1956, **93**: 355-9, bibl. 1, illus.

Sulphate of ammonia has proved the most satisfactory nitrogenous fertilizer. It is recommended that acidity caused by it be corrected with heavy, though infrequent, dressings of lime. The use of selective weedkillers may make it possible to maintain a good turf at a higher pH than has been possible hitherto. For golf greens the ideal soil pH is about 4·6 and for bowling greens and tennis courts 5·0, but this may vary with the soil type. J.R.L.

1744. Mackay, J. H. E., and Brockwell, J.
**A comparison of two fungicides for control of dollar spot.**
*J. Aust. Inst. agric. Sci.*, 1956, **22**: 206-7, bibl. 3.

On a golf course green of creeping bent and chewings fescue infected with dollar spot (*Sclerotinia homoeocarpa*) no reduction of incidence or affected area occurred when ferrated Actidione (0·09 g. of the antibiotic cycloheximide + 2·16 g. ferrous sulphate in 6·72 l. water) was applied, but an appreciable reduction of affected areas resulted when 0·1% PACA (phenylamino-cadmium-acetate) was applied fortnightly during most of the summer.—C.S.I.R.O., Canberra.

J.R.L.

## *Orchids.*

(*See also* 1782c, y, 1970, 2008p.)

1745. Schutt, K.
Vereinfachte Anzucht von Orchideen aus Samen. I. Herstellung und Sterilisieren der Nährböden. **(A simplified method of raising orchids from seed. I. Preparation and sterilization of the medium.)** [English, French, Spanish summaries 3–4 lines each.]
*Mitt. Klosterneuburg, Ser. B*, 1956, **6**: 305-11, bibl. 5, illus.

A rapid method of sterilizing the medium and of adjusting its pH value is described. Polythene film was used for sealing the flasks instead of cotton wool.

1746. Belalcazar G., J. A.
Apuntes sobre el cultivo de la orquidea. **(Notes on the cultivation of orchids.)**
*Agric. trop. Bogotá*, 1956, **12**: 243-7, illus.

Colombian methods of planting in wooden baskets and in the forks of trees are briefly described. The commonest growth medium consists of layers of chips of stone or brick, wood charcoal, and a 4 : 1 mixture of crumbled coconut fibre and leaf mould. In some cases wood chips are used instead of stone or brick, and the fibre-mould mixture may be replaced by one of fresh moss, decomposed leaves (especially of leguminous plants) and fibrous roots of ferns.

1747. Jefferson, R. N., and others.
**Spotting of *Cymbidium* flowers.**
Reprinted from *Bull. Amer. Orchid Soc.*, 1954, **23**: 729-43, bibl. 15, illus.

Spotting of *Cymbidiums*, which can be serious in lathhouses, may be caused by *Botrytis* infection, by mechanical injury or by insecticides, insects or other pests. *Botrytis* damage and mechanical injury can largely be prevented by protection from rain, wind and hail, and avoiding overhead watering. It is important in *Botrytis* prevention to keep the plants dry during cool weather; spraying has proved impracticable. Pest control may be achieved by careful spraying and by elimination of host plants near the orchid houses.

## *Succulents.*

1748. Baker, K. F., and Durbin, R. D.
**Control of *Pythium* root rot of *Aloe variegata* by hot-water treatment.**
Reprinted from *Cactus and Succ. J., Los Angeles*, 1956, **28**(2): 45-6, bibl. 1, illus.

*Pythium ultimum* was most successfully controlled in young plants of *Aloe variegata* by hot water treatment at 115° F. for 20 to 30 minutes. Treatment for 40 minutes damaged the plants in some cases. Limited tests with *Haworthia attenuata* gave similar results.—Univ. Calif., Los Angeles.

1749. Durbin, R. D.
**A method for separating cactus seed.**
Reprinted from *Cactus and Succ. J., Los Angeles*, 1956, **28**(2): 50.

A method for separating seed from the mucilaginous seed masses of *Lemaireocereus dumortieri* and *Escontria chiotilla* is described. The seed masses were soaked in a 3% mixture of commercial pectic enzyme for 48 hours, after which the seeds were rinsed and either dried or sown immediately. Germination was not reduced by the treatment.—Univ. Calif., Los Angeles.

1750. Chopinet, R.
Les sansevières (*Sansevieria*). **(Sansevierias.)**
*Jardins Fr.*, 1956, **2**: 216-18, illus.

Notes are given on the characteristics, cultivation and propagation of *S. trifasciata* vars. *zebrina* and *laurentii*, *S. metallica*, *S. thyrsiflora*, *S. fasciata* and *S. cylindrica*.

### *Roses.*

(*See also* 1782a, u, 1786.)

1751. Lundstad, A.
Stilkroser. Provedyrking av remontant-og thehybridsorter, og ei jamføring av disse rosegruppene. (**Standard roses. Variety trials with hybrid perpetual and hybrid tea roses and a comparison of the two groups.**)
*Gartneryrket*, 1956, **46**: 877-84, bibl. 4, illus.

The following among other differences were observed in a comparison of hybrid perpetual and hybrid tea roses: The former were more rust and mildew resistant, had slightly more flowers, which were more fully double, and the plants were about one-third higher. The flowers of hybrid tea roses, on the other hand, had larger diameters. The range of colour shades was not identical in the two groups, but no differences in scent were noticed. A number of varieties are recommended. —Inst. Dendrol. Nursery Manag., Norwegian agric. Coll.

1752. Fleischhauer, O.
Ein neuartiger Okulationsschnellverschluss. (**A new quick method for binding budded plants.**)
*Dtsch. Baumsch.*, 1957, **9**: 23-5, illus.

A strip of gutta percha is wrapped over the cut and the bud, and its ends secured at the opposite side of the shoot by wire. The method has been successful both for speed and "take" in a season's trial with roses.

1753. Lundstad, A.
Forsøk med høst-og vårplanting av poderoser. (**Time of planting trials with budded roses.**) [English summary ½ p.]
*Forskn. Landbruk.*, 1956, **7**: 477-84, bibl. 6.

Three years' trials with three varieties, carried out at the Norwegian College of Agriculture, Ås, Akerhus, and at Stend Agricultural School, Fana, Hordaland, showed that more autumn-planted roses were killed by frost at Ås than at Stend where the winters are milder. There were no casualties among the spring-planted roses at either place. Autumn planting, on the other hand, resulted in earlier flowering.

### *Other trees and shrubs.*

(*See also* 1008, 1021, 1025, 1103, 1353, 1782g, h, k, l, p, 1783e, 1969.)

1754. Mulligan, B. O., and Nelson, P. K. (Editors).
**Broad-leaved evergreens for every garden.**
*Brooklyn bot. Gdn Rec.*, 1956, **12**: 177-271, illus., available as a separate, price $1.00.

The whole of this number of the journal is devoted to a series of articles on the uses, propagation and culture of hollies, rhododendrons, camellias and other broad-leaved evergreens in different parts of the United States. Among them are papers on methods of raising evergreens from seed and cuttings at the Holden Arboretum, methods of propagating rhododendrons from cuttings used in a Washington State nursery, types of camellia found winter-tolerant in New York State, and the use of plastic coatings to protect evergreens in winter.

1755. Pardy, A. A.
**Notes on indigenous trees and shrubs of Southern Rhodesia.**
*Rhod. agric. J.*, 1956, **53**: 952-65, illus.

Includes illustrated descriptions of: *Albizzia anthelmintica* (medicinal bark); *Commiphora pilosa* (suitable for hedges); *Garcinia livingstonei* (edible fruit); *Holarrhena febrifuga* (ornamental and medicinal); *Maesa lanceolata* (medicinal and suitable for hedges); *Rhamnus prinoides* (hedge shrub).

1756. Pilet, P.-E., and Michel, H.
Rhizogenèse végétative et auxinique de plantes ligneuses. (**Vegetative and auxin-induced root formation in woody plants.**)
*Rev. hort. suisse*, 1957, **30**: 41-5, bibl. 22, illus.

A method of air-layering is described, in which a ring of bark 1 to 2 cm. wide is removed from the branch and lanolin paste containing IAA applied to the wound. Moist soil and sphagnum are then packed round the cut and the whole enclosed in a plastic band. In tests the concentration of IAA varied from $1 \cdot 10^{-3}$ M to $1 \cdot 10^{-8}$ M, and the duration of application from 10 days to 2 months. Woody ornamentals, including laticiferous species and conifers, which rooted successfully, are listed.

1757. (Kamp, J. R.)
**Container growing in the Midwest.**
*Ill. St. Flor. Ass. Bull.*, Nov.–Dec. 1956, reprinted in *Amer. Nurserym.*, 1956, **104**(12): 10-11, 79-81, illus.

An account is given of the methods used in a large nursery in Illinois where ornamental plants are grown for sale in metal containers. The containers are stood on asphalt covered with gravel. In most cases the plants are kept in the containers for 3 years. Arctic blue willow cuttings have been successfully rooted in the containers with the aid of cardboard carton covers. The same growing medium, 60% fine peat + 40% molders' sand, is used in the propagation benches, flats and containers. Watering and fertilizing is done by sprinkler irrigation.

1758. Waxman, S., and Nitsch, J. P.
**Influence of light on plant growth.**
*Amer. Nurserym.*, 1956, **104**(10): 11-12, illus.

Experiments at Cornell University with deciduous trees, shrubs and evergreens have shown that at a minimum temperature of 70° F. many of the species tested will continue active growth indefinitely when the day-length is maintained at 15 hr. or longer, whereas under a day-length of 12 hr. or less dormancy is induced. At 50° F. day-lengths of 21 hr. or more are needed to maintain continuous growth. A light-break of 1 hr. in the middle of the dark period, however, will keep some species actively growing under a 9-hr. day-length at 70° F. Plants showing the best growth response to long-day treatment included *Cornus florida*, *C. kousa* and *Weigela florida*. Cuttings of pink and white flowering dogwood produced 2–3 times as many roots under long-day conditions as under short-day. When the cuttings were grown under an 18-hr. day at 70° F. they grew continuously and attained a height of 8 ft. after 1 year, whereas those grown under natural day-

length lost their leaves and became dormant in the autumn and attained a height of only 10 inches.

1759. (Downs, R. J., and Borthwick, H. A.)
**What day length means to trees.**
*Agric. Res., Wash.*, 1956, **5**(6): 10.

At Beltsville most of the test trees stopped growing within about 4 weeks of being restricted to 8 hours of natural light. When temperatures were lowered growth was checked and the leaves began to colour whatever the day-length. When the photoperiod was lengthened again soon after growth had been checked catalpa, birch and tulip poplar [*Liriodendron tulipifera*] resumed growth, but continuous light was necessary to induce renewed growth of sweet gum [*Liquidamber styraciflua*]. Defoliation resulted in re-growth of sweet gum and paulownia, but was not effective with dogwood, elm or catalpa. Under incandescent light trees grew twice as tall as normal owing to the far-red component of the light.

1760. Neiswander, R. B.
**Control of insect pests of ornamentals.**
*Amer. Nurserym.*, 1956, **104**(9): 11, 78-81, illus.

Experiments have indicated that attacks by several types of borer on ornamental trees and shrubs may be prevented when the trunk and larger branches are covered with DDT during the period of oviposition. With gall-forming pests good results were generally obtained using combination sprays of malathion with DDT or parathion, although timing was important.—Ohio agric. Exp. Stat., Columbus.

1761. Schread, J. C.
**Thrips on privet and other insects on ornamentals.**
*Circ. Conn. agric. Exp. Stat.* **201**, 1956, pp. 11, bibl. 3, illus.

In 3 years' experiments *Dendrothrips ornatus* was successfully controlled on California privet (*Ligustrum californicum*) by late-June or early-July applications of DDT or malathion as emulsions at 1 pint/100 gal. or as wettable powders at 1 to 2 lb./100 gal. Other pests controlled by single applications of malathion were the scale *Neolecanium cornuparvum* as magnolias, the scale *Toumeyella liriodendri* on tulip trees, the leaf miner *Monarthropalpus buxi* and the psyllid *Psylla buxi* on boxwood, and the whitefly *Tetraleurodes mori* on mountain-laurel (*Kalmia latifolia*).

1762. Teuscher, H.
**The red maple—a neglected tree.**
*Amer. Nurserym.*, 1956, **104**(9): 9, 58-9, illus.

*Acer rubrum* grows slowly and develops chlorosis in heavy, alkaline soils, but this handicap to its wider use can be overcome either by regular applications of sulphate of ammonia or by budding it on soft maple stocks, *A. saccharinum*. Selection of strains, e.g. *A. r. schlesingeri*, is necessary to ensure the regular production of brilliant red foliage; other strains exist which always colour indifferently or only turn bright red in certain years. Raising plants from seeds is facilitated if freshly gathered seeds are kept moist and warm for 3–4 days until they swell and crack and are then sown. Plants can also be raised from cuttings taken in June and rooted under intermittent mist in a 50 : 50 mixture of shredded sphagnum and granite sand with the pH kept to near 6, but the growth of cuttings is much slower than that of budded plants.—Montreal bot. Gdn.

1763. Vergnano, O.
L'evoluzione della cerchia legnosa in *Arbutus unedo* L. dal Marzo al Dicembre 1952 a Messina. **(The development of the woody cylinder in *Arbutus unedo* from March to December 1952 at Messina.** [English summary ½ p.]
*Nuovo G. bot. ital.*, 1953, **60**: 102-8, bibl. 2, illus. [received 1957].

The main phase of cambial activity began in early April and stopped completely in mid August, to be followed by a brief second phase covering October and November. This differed from the growth rhythm of *A. andrachnoides* in Florence, where there is only one phase of cambial activity from April to October inclusive, least vigorous in August and September.—Ist. Bot. Univ. Messina.

1764. Peeters, F.
Formation des racines et température du sol chez les azalées. **(Root formation and soil temperature in azaleas.)** [English and German summaries 5 lines each.]
*Rev. Agric. Brux.*, 1956, **9**: 1204-11, illus.

Cuttings of *Azalea indica, A. japonica* and other species and also grafted and ungrafted cuttings of *A. concinna* were left for 7 weeks in peat or a 2 : 1 mixture of peat and leaf mould. Soil temperature was maintained at 15° C. or 20° C., but was allowed to vary in the controls, where no heating was used. Rooting was rapid and prolific at 20° C., fair at 15° C., and much less advanced in the controls. The variety Oranje Boven, notoriously difficult to root, was severely affected by damping-off in the controls, but at 20° C. losses were negligible. Graft unions, not complete in the controls, were perfect in both the 15° and 20° C. series. In the early stages the mixed medium was slightly superior to peat. Rooting at 20° C., although initially the most costly, may prove economic in view of the shorter time required.

1765. Stautemas, E.
Essai d'enracinement des boutures d'azalées dans des terres de compositions différents et au moyen du chauffage électrique du sol. **(Experiment in rooting azalea cuttings in soils of different composition and with the aid of electrical heating of the soil.)** [English and German summaries 3 lines each.]
*Rev. Agric. Brux.*, 1956, **9**: 1212-16, illus.

Soil temperature was maintained at approximately 15° C. or 20° C., the controls being unheated. Rooting media were peat, new azalea soil with and without ⅓ of peat or sawdust, and old azalea soil with and without ⅓ of sawdust. After 17 days at 20° C. rooting had begun, and in all media there was strong callus formation, but at 15° C. no root formation was evident at this stage. After 24 days at 20° C. rooting was very prolific and uniform in soil + peat and almost as good in peat alone. It was least advanced in mixtures containing sawdust and intermediate in the unmixed soils. At 15° C. 40%–60% of cuttings rooted, and pure peat

gave better results than the other media. Without heating only a small percentage of cuttings rooted and losses from damping-off were very heavy.

1766. Anon.
**Ohio azalea test reveals best growing conditions for plants.**
*Flor. Exch.*, 1957, **127**(26): 9.
The effects of lighting and misting on the growth of young plants of 4 azalea varieties have been studied at Ohio State University. The best results were obtained with plants grown under lath or in full sun. Supplementary lighting under lath did not increase growth enough to repay the cost and mist was detrimental. Low temperature had little effect on early autumn leaf-fall, but late N applications reduced it.

1767. Hollunder, W.
Schäden an Azaleen durch Germisan. **(Injury to azaleas caused by Germisan.)**
*Dtsch. Gartenb.*, 1956, **3**: 287, illus.
Mercury vapours from the fungicide Germisan, left exposed in a greenhouse, caused severe leaf drop in azaleas.

1768. Schread, J. C.
**Dogwood borer, *Thamnosphecia scitula* (Harr.).**
*Circ. Conn. agric. Exp. Stat.* **199**, 1956, pp. 4, bibl. 3, illus.
The larvae of this moth are apt to do serious damage to the stems of flowering dogwood, *Cornus florida*. The results are summarized of 4 years' trials, in which good control of overwintering larvae was obtained by a single spray application in May of aldrin or lindane and reinfestation was prevented by spraying the trunks of trees with DDT or dieldrin at monthly intervals starting on June 1.

1769. Boyle, W. W., and Haramoto, F. H.
**Cyclamen mite on pikake.**
*Hawaii Fm Sci.*, 1956, **5**(2): 1, 7-8, illus.
In March, 1956, the cyclamen mite, *Steneotarsonemus* [syn. *Tarsonemus*] *pallidus* was found to be doing serious damage to pikake, *Jasminum sambac*, grown commercially as a lei flower. The mite and its life history are described. In preliminary trials with acaricides a considerable reduction of infestation followed 5 applications at 10-day intervals of endrin at 2 lb. 10% w.p./100 gal. Metacide and parathion were less effective and were also clearly phytotoxic.

1770. Singh, P.
**Vegetative propagation in some Bignoniaceae.**
*Sci. and Cult.*, 1956, **21**: 737-8, illus.
Applications of β-indolyl acetic acid to softwood cuttings of 3 bignoniaceous species did not induce rooting. With hardwood cuttings of *Kigelia pinnata* rooting was successfully initiated by a 12-hour treatment with 20 p.p.m. IAA.—Nat. bot. Gdns, Lucknow.

1771. Chardenon, J., and Taris, B.
Effet phytotoxique de quelques fongicides vis-à-vis des boutures de peupliers. **(Phytotoxic effect of some fungicides on poplar cuttings.)**
*C.R. Acad. Agric. Fr.*, 1956, **42**: 709-12.
Fungicides used to control the 2 major diseases of young poplar plants were applied at various concentrations to poplar cuttings to test their phytotoxicity. After applying of 5% dinitrobutyl phenol the cuttings did develop but the roots produced were mainly necrotic. The strike of cuttings sprayed with DNOC or anthracene oil emulsions at 5% was high, although the roots were slightly necrotic. Copper compounds appeared to have no marked phytotoxic effects.—Inst. nat. Agron., Paris.

1772. de Pietri-Tonelli, P., and Rosi, O.
Il *Cryptorrhynchus lapathi* L. Un solo trattamento tempestivo con parathion consente di liberare i fusti dalle larve del curculionide. ***Cryptorrhynchus lapathi*. One well timed treatment with parathion frees trunks from the larvae of the curculionid.)**
*Ital. agric.*, 1956, **93**: 957-63, bibl. 9, illus.
Differences in the life cycle of the pest are outlined for European countries, Canada and the U.S.A. and control measures are briefly reviewed. Trunks of 4-year-old poplars were cleared of living larvae in bark, wood and pith by a brush application in May of 0·5% parathion. Larvae in the pith were not killed by the external application of L 343 (*N*-mono-*iso*propylamide of O,O-diethyldithiophosphorylacetic acid) or of L 395 (*N*-monomethylamide of O,O-dimethylthiophosphorylacetic acid), but these compounds killed larvae in the bark and wood.

1773. Reeks, W. A., and Smith, C. C.
**The satin moth, *Stilpnotia salicis* (L.) in the Maritime Provinces and observations on its control by parasites and spraying.**
*Canad. Ent.*, 1956, **88**: 565-79, bibl. 18, maps.
The satin moth is a pest of shade trees particularly attacking poplar. Many of the hibernating larvae are killed when the minimum temperature falls below −30° F. Slight control of the pest is obtained by native parasites and disease organisms, and a high degree of parasitism was observed with 2 introduced parasites (*Apanteles solitarius* and *Compsilura concinnata*). Satisfactory control was obtained either by spraying with DDT in the spring, when the leaves were fully developed, or by spraying in August at the time of maximum hatching. In the summer treatment only the trunk and lower branches need be sprayed.—Lab. For. Biol., Fredericton, N.B.

1774. Carlson, R. F.
**Western sand cherry as a hedge.**
*Amer. Nurserym.*, 1957, **105**(2): 11-12, bibl. 2, illus.
A bushy clonal selection of *Prunus besseyi* has proved very satisfactory as an ornamental hedge plant. The plants are hardy and slow growing but will reach a height of 3–4 ft. after 4–6 years. To form a compact hedge they should be planted 12–15 inches apart. Shearing the plants into a round-topped hedge was better than light pruning of uneven growth only. Methods of propagation by cuttings or layers and maintenance are discussed.—Mich. St. Univ., E. Lansing.

1775. Royal Horticultural Society.
*The rhododendron and camellia year book, 1957, No. 11.*
R.H.S., London, 1956, 9×5½ in., pp. 146, illus., 10s.+1s. postage, or U.S. $1.65 post free.

An account is given by Dr. H. Skinner of a collecting expedition in the southern and eastern states of the U.S.A. in search of native azaleas. The cultivation of dwarf rhododendrons as pot plants is described by J. Davidson. Ten specialists contribute to a symposium on "My favourite camellias". Articles are also included on rhododendrons at Trengwainton, frost damage to rhododendrons, camellias and azaleas, camellia names and classification, and a new genus *Yunnanea* closely related to *Camellia*. Notes are provided on many varieties of rhododendron and camellia and on various shows.

1776. Hanger, F.
**The raising of rhododendrons from seed.**
*R.H.S. Rhododendron Camellia Yearb. 1957*, No. 11, pp. 70-4.

Notes are given on seed harvesting, sowing and treatment of seedlings. In the author's experience the best seed compost for use in a heated propagating frame is sieved granulated peat mixed with a little silver sand; the mixture should have a pH of 4·0–4·5. The compost recommended for a cold frame consists of equal parts of granulated peat and lime-free loam with a surface layer of sieved granulated peat and silver sand. Airtight plastic dishes make excellent propagators for amateurs, the ideal compost for these being equal parts of sphagnum moss and granulated peat passed through a fine sieve.

1777. Leiser, A. T.
***Rhododendron occidentale* on alkaline soil.**
*R.H.S. Rhododendron Camellia Yearb. 1957*, No. 11, pp. 47-51, illus.

Specimens of the Western azalea (*Rhododendron occidentale*) were found growing on an alkaline serpentine soil in California. The soil in the root zone (to a depth of 2 ft.) had a pH of 7·2 to 8·3 but had a very low calcium level. It is suggested that rhododendrons may be more affected by calcium level than by pH. Other factors, including relatively low fertility, which may be responsible for the tolerance of this species for a serpentine soil, are being investigated.—Univ. Calif., Los Angeles.

1778. Montagnani, P.
L'influenza delle condizioni fotoperiodiche e termiche sull'accrescimento e riproduzione della *Salvia longistyla* Benth. **(The effects of photoperiodic and temperature conditions on the growth and reproduction of *Salvia longistyla*.)** [English summary ¾ p.]
*Nuovo G. bot. ital.*, 1953, **60**: 434-62, bibl. 7, illus. [received 1957].

This ornamental plant of Mexican origin was subjected to different day lengths and temperatures at the University of Parma. It required short day conditions (14 hr. or less) for both initiation and maturation of flower buds, and for flowering, night temperatures of approximately 18° C. and not lower than 15° C. Under natural conditions in Italy therefore it flowers in autumn. Fruiting was brought about by artificial pollination. No flowers were produced on basal shoots even under optimal thermal and photoperiodic conditions. A great extension of day length checked elongation of the internodes. The perennial bushy habit of the plant in its natural habitat is attributed to the mechanism which confines flowering to the main axis.

1779. Montagnani, P.
Fioritura estemporanea della *Salvia longistyla* Benth. come risultato di variazioni delle condizioni di temperatura durante la nictofase. **(Early flowering of *Salvia longistyla* as a result of variation in temperature conditions during the dark phase.)** [English summary ⅓ p.]
*Nuovo G. bot. ital.*, 1953, **60**: 690-4, illus. [received 1957].

In greenhouse experiments plants of *Salvia longistyla* flowered in spring when night temperatures were kept at 18° C. from 10 Feb. onwards, whereas plants kept at a night temperature of 13° C. remained completely vegetative until the autumn. Both groups were exposed to the same day temperatures and to natural photoperiods.

### *Sundry ornamentals.*

(*See also* 1782j, r, x, z.)

1780. Glater, R. A. B.
**Smog damage to ferns in the Los Angeles area.**
*Phytopathology*, 1956, **46**: 696-8, bibl. 6, illus.

Smog produced tan coloured spots on fern leaves, followed by dehydration of the affected area and final necrosis of the leaf. Mature and young leaves were equally sensitive, but the growing point was generally immune and damage was confined to leaves. Ferns were more sensitive than other plants and showed a much more random distribution of foliar lesions.—Univ. Calif., Los Angeles.

1781. Anon.
Lotosblumen aus jahrhundertealtem Samen gezogen. **(Lotus flowers raised from centuries-old seed.)**
*Dtsch. Gartenb.*, 1956, **3**: 293-4, illus.

The article, which was made available by the Chinese Embassy in East Germany, describes lotus plants (*Nelumbo nucifera*) raised from seeds at least 200 years old. The seeds were found buried in the silt of a pond which dried out 190–280 years ago. They germinated at the Peking Botanic Gardens after removal of the seed coats.

### *Noted.*

1782.
a Astrego, J. J.
De cultuur van rozenonderstammen in Sleeswijk-Holstein en Denemarken. **(Cultivation of rose rootstocks in Schleswig-Holstein and Denmark.)** [English summary ¼ p.]
*Meded. Dir. Tuinb.*, 1956, **19**: 815-22, illus.
Types, especially varieties of *R. canina*, and mechanization.

b BENDALL D. S., AND HILL, R.
**Cytochrome components in the spadix of *Arum maculatum*.**
*New Phytol.*, 1956, **55**: 206-12, bibl. 12.

c BIOLOGICAL BRANCH, N.S.W. DEPARTMENT OF AGRICULTURE.
***Cymbidium* mosaic.**
*Agric. Gaz. N.S.W.*, 1956, **67**: 526, 556, illus.
Symptoms and prevention.

d BLACK, S., RASMUSSEN, A. O., AND GIANFAGNA, A. J.
**Flower arrangement.**
*Circ. Pa St. Univ. Coll. Agric., Ext. Serv.* **461**, revised 1956, pp. 27, illus.
Including notes on making cut flowers last longer.

e BOSSARD, R.
Conservation hivernale des oignons à fleurs. **(Winter storage of flower bulbs.)**
*Jardins Fr.*, 1956, **2**: 219-21, illus.
Begonia, canna, dahlia, gladiolus, lily, montbretia and tigridia.

f BUTTERFIELD, N. W.
**Storing gladiolus corms.**
*Wis. Hort.*, 1956, **47**: 118.
Notes on curing, thiram-DDT treatment and cool storage.

g CARRA, P.
Les mimosa arbres à fleurs coupées. **(Mimosa trees for cut flowers.)**
*Rev. hort. Algér.*, 1956, **60**: 187-91.
Notes on 5 *Acacia* spp. and their culture.

h CHATURVEDI, M. D.
**The Persian lilac.**
*Indian Fmg*, 1956, **6**(6): 14-15, illus.
Notes on *Melia azedarach* grown in India as an ornamental.

i CHIARUGI, A.
Le date di fondazione dei primi orti botanici del mondo: Pisa (estate 1543); Padova (7 luglio 1545); Firenze (1° diciembre 1545). **(The foundation dates of the first botanical gardens in the world: Pisa (summer 1543); Padua (7th July, 1545); Florence (1st December, 1545).)** [English summary ¾ p.]
*Nuovo G. bot. ital.*, 1953 (issued 1954), **60**: 785-839 [received 1957, see also Abstr. 10841].

j COOKE, C. H.
**Ivies for home and garden.**
*Gdnrs' Chron.*, 1956, **140**: 489, illus.
Many *Hedera* spp. described, and propagation and uses discussed.

k DAVIS, S. H., JR.
**Plant diseases and their controls.**
*Amer. Nurserym.*, 1956, **104**(10): 32-40.
On woody ornamentals.

l DIETERICH, H.
Erfahrungen mit Potentillasorten. **(Observations on potentilla varieties.)**
*Dtsch. Baumsch.*, 1956, **8**: 273-6.
Notes on sub-species and varieties of *P. fruticosa*.

m FOURY, R., AND FOURY, C.
*Colocasia antiquorum* (Schott). Légume des tropiques, ornement de nos serres et pelouses. **(*Colocasia antiquorum*, a tropical vegetable and ornamental plant for glasshouses and lawns.)**
*Rev. hort. Paris*, 1956, **128**: 1554-6, bibl. 9, illus.
Description, nutritive and garden value.

n GEROLA, F. M.
Ricerche di citofisiologia della segregazione. 1. Nettari settali. **[Studies on the cytophysiology of secretion. 1. Septal nectaries.)** [English summary 2¼ pp.]
*Nuovo G. bot. ital.*, 1953, **60**: 463-517, bibl. 124, illus. [received 1957].
Changes in structure in developing nectaries of *Kniphofia*, *Hemerocallis* and *Canna* spp.

o GREENFIELD, I.
**Diseases of turf.**
*Gdnrs' Chron.*, 1956, **140**: 458-9, illus.
And their control in Britain.

p KOCH, F.
*Ribes* × *darwinii* Fr. Koch, eine neue Hybride. **(*Ribes* × *darwinii*, a new hybrid.)**
*Dtsch. Baumsch.*, 1957, **9**: 25-6, illus.
Syn. *R. menziesii* × *R. niveum*.

q LANTZ, H. L.
**Is Meyer Zoysia for Iowa?**
*Ia Fm Sci.*, 1956, **11**(5): 9-10, illus.
Observations on behaviour in test plots.

r MACCARIO, G.
Una planta coltivata industrialmente per il verde ornamentale: l'*Asparagus plumosus* Baker. **(A plant cultivated commercially for ornamental foliage: *Asparagus plumosus*.)**
*Riv. Fruttic.*, 1956, **18**: 473-6, illus.
Culture on the Italian Riviera under glass and reed-matting shade.

s MCQUOWN, F. R.
**A further note on grafting.**
*Gdnrs' Chron.*, 1956, **140**: 485, illus.
Growth of *Aporocactus flagelliformis* on *Selenicereus grandiflorus*.

t MAMELI-CALVINO, E.
Il papavero della California. **(The Californian poppy.)**
*Ital. agric.*, 1956, **93**: 964-6, illus.
Notes on several *Eschscholtzia* spp. and their culture.

u MARCUSSEN, K. H.
**Roses in the home garden.**
*Bull. N.Z. Dep. Agric.* **359**, [1956], pp. 16, illus.
Types, planting, pruning, management, propagation, and pest and disease control.

v MILLER, V. J.
**Landscaping.**
*Ext. Circ. Neb. agric. Ext. Serv.* **56-1201**, 1956, pp. 11, illus.
The principles of garden design and notes on planting.

w NAEGELE, J. A.
**Tentative program guide for applications of insecticides.**
*Flor. Exch.*, 1956, **127**(26): 10, 39.
For pests of shrubs, bulbs and herbaceous plants.

x NJOKU, E.
**The effect of defoliation on leaf shape in *Ipomoea caerulea*.**
*New Phytol.*, 1956, **55**: 213-28, bibl. 8, illus.
For earlier work see *H.A.*, 26: 3969.

y PÉREZ, J. E., ADSUAR, J., AND SALA, O.
**Tobacco mosaic virus in orchids in Puerto Rico.**
*Phytopathology*, 1956, **46**: 650-4, bibl. 6, illus.
In *Cattleya* spp.

z SCHENK, H.
Une nouvelle variété de lierre résistant aux gros gels: *Hedera helix woerneri*. (**A new variety of ivy resistant to hard frosts.**)
*Rev. hort. suisse*, 1957, **30**: 49-50, illus.

1783.

a SHIMOKORIYAMA, M.
**Anthochlor pigments of *Coreopsis tinctoria*.**
*J. Amer. chem. Soc.*, 1957, **79**: 214-20, bibl. 10.
Two anthochlor pigments identified in ray flowers of garden variety.

b SINGH, P.
**Observations on *Tagetes erecta* Linn.**
*Indian J. Hort.*, 1956, **13**: 108, illus.
Occurrence of adventitious roots along the stem.

c SKIEBE, K.
Artbastardierung und Polyploidie in der Gattung *Cheiranthus* L. (**Species hybridization and polyploidy in the genus *Cheiranthus*.**)
*Züchter*, 1956, **26**: 253-63, bibl. 42, illus.
Including polyploids induced with colchicine.

d SKIVER, R. E.
**The use of antibiotics and fungicides in mist propagation.**
*Plant Dis. Reptr*, 1956, **40**: 1074-80, bibl. 7, illus.
**Carnation diseases checked by mist propagative system.**
*Bull. Colo. Flower Grs*, Aug. 1956, reprinted in *Flor. Exch.*, 1957, **128**(1): 9.
See *H.A.*, 27: 683.

e STEARN, W. T.
**A new hybrid *Viburnum*.**
*J. roy. hort. Soc.*, 1956, **81**: 538-40, illus.
*Viburnum* × *hillieri* "Winton".

f VANCE, A. M.
**Lawn insects and how to control them.**
*Home and Gdn Bull. U.S. Dep. Agric.* **53**, 1956, pp. 24, illus.
Concise, up-to-date recommendations on controlling many pests.

g VICKERY, R. K., JR., AND OLSON, R. L.
**Flower color inheritance in the *Mimulus cardinalis* complex.**
*J. Hered.*, 1956, **47**: 194-9, bibl. 2, illus.
At least 10 pigments present, and genes controlling them.

## SUB-TROPICAL FRUIT AND PLANTATION CROPS.

### *General.*

(*See also* 1073, 1144, 1862c, e, n, r, y, 1863d, h, 1865, 1998.)

1784. FUJITA, K., AND OTHERS.
**Experiments on the practical use of a mist-sprayer for citrus, persimmons and peaches. No. 2.** [Japanese, with 3 English summaries 9, 10 and 8 lines.]
*Bull. Kanagawa agric. Exp. Stat. hort. Sect.*, 1956, No. 4, pp. 13-17, 17-19, and 19-21, bibl. 3.
A mist blower and conventional power and hand sprayers were compared for pest and disease control. The control of yanone scale (*Unaspis yanonensis*) with Folidol and of red mite (*Tetranychus* sp.) with DN emulsion on citrus was as effective using the mist blower as with the other machines. The Japanese persimmon fruit moth (*Kakivoria flavofasciata*) was also controlled as effectively with lead arsenate applied by mist blower as by conventional methods; one concentrated application of lead arsenate was more effective for controlling heavy infestations of this pest than frequent applications at lower concentrations. Experiments on 7-year-old peach trees showed that *Taphrina deformans*, *Cladosporium carpophilum* and red mite (*Tetranychus* sp.) were controlled most economically with Dithane, DDT, Folidol and Nitran when these were applied by the mist blower. [For report on earlier tests see *H.A.*, 26: 1062.] J.R.L.

1785. ZECK, E. H.
**Tree-hoppers.**
*Agric. Gaz. N.S.W.*, 1956, **67**: 428-30, illus.
The damage done to citrus, peach and nectarine leaves and fruits by the citrus tree-hopper (*Caedicia strenua*) and the inland tree-hopper (*C. simplex*) and to the leaves of citrus by *C. olivacea* is described. Treatments recommended are 0·1% DDT emulsion on peaches in late October and 0·02% parathion, 0·02% BHC or 0·05% DDT emulsion on citrus during the spring.
J.R.L.

1786. ABRAHÃO, J., AND ORLANDO, A.
Notas sôbre *Macrodactylus pumilio* Burm., como praga de diversas culturas e seu contrôle com inseticidas modernos. (**Notes on *Macrodactylus pumilio*, a pest of various crops, and its control with modern insecticides.** [English summary ½ p.]
*Biológico*, 1956, **22**: 147-55, bibl. 10, illus.
The beetle was found attacking flowers of citrus, avocadoes, jaboticabas (*Myrciaria jaboticaba*), roses

and custard apples, and fruits of cashews and peaches. It was completely controlled in laboratory tests by dusting with 1–2% BHC, 2% lindane, 0·5–1% parathion, 2% endrin, 1·5% chlorthion, 3% aldrin, 2% dieldrin, or a mixture of 0·8% piperonyl butoxide and 0·05% pyrethrins. Good results in field tests were given by dusting with 1–2% BHC and by spraying with 200 c.c. of 5% parathion emulsion per 100 l. of water.

### *Avocadoes.*

(*See also* 1177, 1383, 1862g, q, s, 1863b, c, f, k.)

1787. Avocado Variety Committee (Rounds, M. B., and others).
**Check list of avocado varieties.**
*Yearb. Calif. Avoc. Soc. for 1956*, pp. 180-98.
**Recommended avocado varieties.**
*Calif. Citrogr.*, 1956, **41**: 368-70.

A long list of avocado varieties produced in California and elsewhere is given, of which only 5 are recommended for commercial planting in California, namely, Anaheim, Fuerte, Hass, MacArthur and Rincon.

1788. Zentmyer, G. A., and Thorn, W. A.
**Resistance of the Duke variety of avocado to *Phytophthora* root rot.**
*Yearb. Calif. Avoc. Soc. for 1956*, pp. 169-73, bibl. 3.

Preliminary results of field trials confirm the results of glasshouse and lathhouse experiments which showed that the Duke avocado possesses moderate resistance to *Phytophthora cinnamomi* [see also *H.A.*, 26: 2064]. *Persea skutchii*, *P. borbonia* and *P. donnell-smithi* show a high degree of resistance but are not compatible with avocado scions.—Univ. Calif., Riverside.

1789. Gillespie, H. L.
**Preliminary investigation of "residual juvenility" in avocado seedling stems.**
*Yearb. Calif. Avoc. Soc. for 1956*, pp. 132-4, bibl. 3, illus.

A 4-year-old Mexican type seedling was cut back to 1 ft. in height and shoots developed on the trunk were allowed to grow until long enough to provide 3 cuttings each. The cuttings were placed in a hotbed with bottom heat controlled at 70–74° F., humidity over 80% and average air temperature 64° F. The basal cuttings rooted in 28 days and produced 5 roots, the intermediate cuttings produced 1 root on the 36th day and the terminal cuttings 1 root on the 46th day.

1790. Beck, W. R.
**Methods of topworking avocado trees.**
*Yearb. Calif. Avoc. Soc. for 1956*, pp. 71-6, illus.

The 2 general methods of topworking avocado trees are the saw-kerf [notch] method and the bark graft. The former is more popular and is here described fully with illustrations. Grafting is usually done in February to April onto stumps 12–18 in. high. With both types of graft all cut surfaces are covered with tree seal and a protective paper cover supported by bamboo stakes is tied over the whole stump. The stump area below the paper is white-washed to prevent sunburn.

1791. Bingham, F. T., and Beutel, J. A.
**Avocadoes: iron chlorosis and chelate studies.**
*Calif. Citrogr.*, 1956, **42**: 63-5.

A survey has indicated that chlorosis occurring in avocadoes on calcareous soils is associated with leaf-Fe contents of less than 40 p.p.m. compared with 50–80 p.p.m. in the leaves of healthy trees. In preliminary tests with soil applications of Fe chelates no response was obtained from Fe-DPTA, but trees treated with Chel 138-HFe showed reduced chlorosis and increased leaf-Fe contents.

1792. Peterson, P. A.
**Flowering types in the avocado with relation to fruit production.**
*Yearb. Calif. Avoc. Soc. for 1956*, pp. 174-9, bibl. 6, illus.

Avocado varieties with A-type flowers produce equally well along the coast and inland, whereas varieties with B-type flowers are in general less productive on the coast than inland. Observations indicate that this reduced production from B-type varieties along the coast is associated with cool weather conditions which limit the time and/or opportunity for pollination and consequent fruit set.

1793. Taylor, O. C., and others.
**Avocado seedling growth reduced by "synthetic smog".**
*Calif. Citrogr.*, 1957, **42**: 147-8, illus.

Part of a batch of Zutano avocado seedlings, growing in sand sulture and in air filtered through activated carbon, were supplied with the reaction products from ozone and hexene vapour at about 0·17 p.p.m. for 7 hrs. a day, 5 days a week for 8 weeks. Some leaf injury became apparent after about 2 weeks of fumigation and the treated leaves became progressively more chlorotic. The visible injury was not, however, sufficient to account for a marked stunting of growth induced by the synthetic smog. Moreover, the average number of new leaves produced during fumigation was the same as that produced by the untreated plants. This suggests that fumigation reduced the level of photosynthetic assimilates to a point at which they were no longer sufficient for the proper expansion of new tissue.

1794. Wallace, J. M., and Drake, R. J.
**Albinism and abnormal development of avocado seedlings.**
*Yearb. Calif. Avoc. Soc. for 1956*, pp. 156-64, bibl. 5, illus.

Studies have shown that abnormal, albino-type avocado seedlings do not result from infection with the virus of the avocado sun-blotch disease. Albinism and abnormal growth occurred most commonly when the seeds used had been collected prior to certain stage of fruit maturity. Some off-type seedlings, which developed from seeds collected after the normal ripening period, may have originated from off-bloom or late-set fruit, but occasionally albino plants have developed from seeds taken from well-matured fruits.—Univ. Calif., Riverside.

1795. Erspamer, J. L., and Zentmyer, G. A.
**Effect of Vapam as a soil fungicide in control of *Phytophthora* root rot of avocado trees.**
From abstr. in *Phytopathology*, 1956, **46**: 636.

Several concentrations and methods of application of Vapam were used on avocado trees infected with *Phytophthora cinnamomi*. Infection was reduced by 50 to 100 p.p.m. and eliminated in some plots by 150 p.p.m. to 200 p.p.m. Damage to living roots was severe at the higher concentrations. Field data indicate that the effective use of Vapam is conditioned by the stage of the disease, type of soil, weather at the time of application, solution strength, gallons applied per sq. ft., soil moisture and method of application.

1796. Bean, R. C.
**Biochemical reactions of avocados in relation to standards of maturity.**
*Yearb. Calif. Avoc. Soc. for 1956*, pp. 148-51.

The currently used standard of a minimum of 8% oil content is not considered to be a reliable indicator of avocado maturity. A study of the biochemistry of maturation, in particular the activity of enzymes, coenzymes and metabolic intermediates, recently instituted at the University of California, may lead, however, to the establishment of better standards.

1797. Hall, A. P., Moore, J. G., and Morgan, A. F.
**B vitamin content of avocados.**
*Calif. Agric.*, 1956, **10**(11): 13-14.

The contents of the following B vitamins are recorded for the varieties Fuerte, Anaheim and Haas in several seasons: thiamine, riboflavin, niacin, pantothenic acid, folic acid, $B_6$ and biotin. The results indicate that the avocado compares favourably with most fruits and many other foods as a source of B vitamins and is superior to most as a source of pantothenic acid and $B_6$.

1798. Schroeder, C. A.
**Growth of avocado fruit tissue on artificial media.**
*Yearb. Calif. Avoc. Soc. for 1956*, pp. 165-8, bibl. 4, illus.

The first successful attempt to culture explants from mature avocado fruit tissues was described earlier [see *H.A.*, 26: 977]. In the present experiments tissue sections of avocado fruit have been kept alive and shown evidence of cell division during periods exceeding 5 months.—Univ. Calif., Los Angeles.

### *Citrus—varieties, rootstocks and nursery practices.*

(*See also* 1086, 1862d.)

1799. Cameron, J. W., Soost, R. K., and Frost, H. B.
**Effects of genetic and nongenetic change in nucellar-seedling lines of Satsuma mandarin.**
*Citrus Leaves*, 1956, **36**(11): 8-9, 20, 26, illus.
**Nucellar-seedling lines of Satsuma mandarins.**
*Calif. Citrogr.*, 1956, **42**: 43, 60-3, illus.
**New Satsuma mandarin strains.**
*Calif. Agric.*, 1957, **11**(3): 13, 15, illus.

Comparisons made between two nucellar-seedling lines derived from seedlings of one Satsuma tree in 1916 and 1917 and the vegetatively propagated progeny of the old line indicate that both genetic change and nucellar embryony are responsible for the differences observed. The two nucellar lines differ from the old line in being more vigorous, having larger leaves and producing higher yields of fruit, which colour earlier and consistently contain more soluble solids. These differences can be ascribed to nucellar embryony. In addition, the two new lines differ from one another in fruit shape and leaf size and are thus genetically distinct. They have therefore been designated strains A and B. Several younger nucellar lines from the same parent belong to one or other of these strains, but at least one additional genetic strain, C, with late-maturing fruit has been identified.

1800. Speroni, H. A.
Diferencias biométricas entre las variedades de naranjas Valencia Tardía y Lue Gim Gong. **(Biometric differences between the orange varieties Valencia Late and Lue Gim Gong.)**
*Idia*, 1956, No. 101, pp. 16-20, bibl. 3.

Significant differences in fruit size, number of fruit sections, number of seeds and thickness of skin showed that the two varieties are not, as claimed by many growers, identical.

1801. Fedorov, A. A.
**An interesting case of anomalies in the structure of fruits of sweet and trifoliate orange hybrids.** [Russian.]
*Bot. Žurnal*, 1956, **41**: 1474-8, bibl. 10, illus.

An illustrated description is given of 4 types of segmented, very thick-skinned fruits borne by *Citrus sinensis* × *Poncirus trifoliata* hybrids and botanical and historical aspects are discussed.

1802. Ivanovskaja, A. A.
**The root systems of rootstocks with Chinese lemon scions.** [Russian.]
*Doklady Akad. Nauk S.S.S.R.*, 1956, **109**: 1206-9, bibl. 6.

The types of root produced when the Chinese lemon was grown on lemon, sweet orange, bigaradia and trifoliate rootstocks and on its own roots raised from cuttings are discussed and the distribution of roots under 2 mm. in diameter in different soil layers is graphically illustrated and tabulated. Lemon and sweet orange rootstocks produced large root systems and vigorous top growth, which is undesirable for the Chinese lemon; cuttings resulted in similar plants; and the trifoliate root system was too shallow; but the root system and dwarfing effect produced by *C. bigaradia* was considered suitable for both trench and outdoor cultivation.

1803. Ross, A. A.
**Trifoliata rootstocks for citrus.**
*Qd agric. J.*, 1956, **82**: 441-4, illus.

The seeds of *Poncirus trifoliata* germinate well and develop into uniform plants. The root system is fibrous and resistant to many root diseases. However, it tends to accentuate granulation in the fruit of some varieties and is susceptible to scaly butt virus and therefore cannot be recommended indiscriminately.

J.R.L.

1804. Banfi, A., and Beñatena, H. N.
El pe del trifolio. **(Trifoliate orange rootstocks.)**
*Idia*, 1956, No. 101, pp. 37-42, illus.

The merits and defects of this rootstock are discussed. Exocortis has not been reported with the mandarin Dancy or with the orange varieties Valencia Seedless and Calderón. Where the disease is mild, grafting low and covering the union with soil to encourage scion rooting has given excellent results.—Estac. Exp. Citríc., Concordia, Entre Ríos, Argentina.

1805. Noro, K., and Kajimoto, S.
**The effect of the rootstock Yuzu (*Citrus junos* Tanaka) on the growth of the Satsuma orange (*Citrus unshiu* Marcov). I. On the triploid chromosome of Yuzu.** [Japanese, with English summary ¾ p.]
*Tech. Bull. Kagawa agric. Coll.*, 1955, **7**: 36-40, bibl. 14, illus.

It was found that a very dwarf 14-year-old tree of Sugiyama unshiu (a strain of Satsuma orange) was on a triploid strain of the rootstock Yuzu, which is normally diploid. An intensive investigation has been started, which aims at classifying the strains in a large batch of Yuzu seedlings. J.R.L.

1806. Yukawa, I., Yagi, T., and Takahashi, K.
**Studies on some stocks of Satsuma orange in relation to storage quality. No. 2. On the storage life of Satsuma orange on Kikoku and Yuzu rootstocks.** [Japanese, with English summary 9 lines.]
*Bull. Kanagawa agric. Exp. Stat. hort. Sect.*, 1956, No. 4, pp. 33-7, bibl. 7, illus.

Studies during 1954–55 showed that stored Satsuma oranges from trees on Yuzu rootstocks had a greater percentage of water in the rind, and therefore lost more weight in storage, than fruit from trees on Kikoku rootstocks. The former fruit also contained more carbohydrates and more acid, but less sugar, than the fruit from trees on Kikoku, although the other components were similar. J.R.L.

1807. Garayar, H. N.
Prácticas culturales y elementos menores en los viveros de cítricos. **(Cultural practices and minor elements in citrus nurseries.)**
*Bol. trim. Exp. agropec. P.C.E.A., Lima*, 1955, **4**(4): 16-18.

Under the climatic conditions of Tingo María, Peru, the best and most economical practice was clean cultivation with monthly weeding. There was no significant difference between mulching with rice straw and cover-cropping with *Indigofera* combined with monthly or 2-monthly weeding. Among trace elements tested the most profitable trio was B+Zn+Cu and the only other significant trio was B+Zn+Mn.

### *Citrus—planting and pruning.*

(*See also* 1862b, v.)

1808. Gagnard, J., and Molin, G.
La technique de transplantation des arbres à feuilles persistantes peut-elle être améliorée? **(Can the technique of transplanting evergreen trees be improved?)**
*Fruits et Prim.*, 1956, **26**: 333-4, illus.

In transplanting young lemon trees with bare roots, tying polythene bags over the roots for the 3-day storage interval maintained them in excellent condition. Spraying the foliage with 1 : 5 aqueous vinyl resin had an adverse effect, particularly where the roots were not bagged. The only vigorous survivors 4½ months after transplanting were those with bagged roots and unsprayed tops. Sour orange trees treated with 1 : 8 vinyl resin showed no rolling of leaves. Those with unbagged roots died after transplanting, whereas those kept with their roots in polythene bags for 3 days, whether vinyl-sprayed or not, made excellent growth. The thickness of polythene used was 10/100, but a slightly thicker film might be better.

1809. Goodall, G. E.
**Lemon tree spacing.**
*Calif. Citrogr.*, 1957, **42**: 105.
*Citrus Leaves*, 1957, **37**(2): 13.

A table, based on many observations, is presented, showing the spacings suggested for hedgerow-type lemon plantings in Santa Barbara County, Calif. Factors taken into account are the vigour of varieties and nucellar strains, and whether the soil is virgin (or fumigated) or unfumigated old citrus land and whether it is deep or shallow. The spacings range from 25 ft. × 22 ft. (79 trees per acre) to 16 ft. × 12 ft. (227 trees per acre).

1810. Moore, P. W.
**Pruning makes cents.**
*Calif. Citrogr.*, 1957, **42**: 110, 122.
**Some results of pruning experiments with old orange trees.**
*Citrus Leaves*, 1957, **37**(2): 6, 7, 23.

Earlier work in California on young citrus trees suggested that little was to be gained from pruning orange trees. Recently the results of two experiments show that pruning old and crowded Valencia and Navel orange trees may more than repay the cost in higher yields and/or better fruit size. Pruning in these cases consisted mainly in removing some of the main branches from the tops and centres of the trees. Costs and returns are given.

### *Citrus—tree composition and nutrition.*

(*See also* 1862w, 1986.)

1811. Koto, M., and Takeshita, S.
**Experiments on leaf analysis of Satsuma orange. No. 2. On the seasonal changes in the leaves of mature Satsuma orange trees in relation to biennial bearing. Part 1.** [Japanese, with English summary ¼ p.]
*Bull. Kanagawa agric. Exp. Stat. hort. Sect.*, 1956, No. 4, pp. 43-52, bibl. 21.

Leaf contents of N, P and Mg did not appear to bear any relationship to the crop on the tree. Leaf Ca was very low in May, increased rapidly during early summer and then increased more slowly, the increases being generally in proportion to the crop. When the Ca content of the leaves was high during the winter the crop the following summer was small. The K content of the leaves was highest in the spring and thereafter decreased gradually until the winter. When K was

less than 0·7% in the winter the crop the following year was small. [For part 1 see *H.A.*, 26: 994.]

J.R.L.

1812. Reitz, H. J.
**Timing fertilization of citrus in the Indian River area.**
*Citrus Mag.*, 1957, **19**(5): 8-9, 14, 18-19, bibl. 4.

A fertilizer timing experiment using Valencia trees on sour orange rootstock on a calcareous soil was carried out over 7 years. Results showed that fertilizer applications made before the end of the rainy season (before November 1st) were undesirable. Satisfactory results were obtained with 2 applications, one after the end of the autumn rainy season and one before the summer rainy season, or by one application made in winter. Three fertilizer applications produced no additional response.—Fla Citrus Exp. Stat., Lake Alfred.

1813. Wander, I. W.
**The effect of ammonium and nitrate nitrogen on the exchange capacity of rough lemon roots.**
*Proc. Soil Sci. Soc. Fla, 1955*, **15**: 101-7, bibl. 7, illus.

Observations made from a nutrient culture experiment using rough lemon seedlings indicate that ammonium nitrogen sorption or the resultant active acidity produced can alter the cation sorbing capacity of the root system. This results in a decreased sorption of other cations, especially calcium. This would indicate that field practices, such as close pH control of the soil, should be followed to favour rapid nitrification of applied ammonium sources. Where nitrification is poor, nitrate nitrogen should be used until good nitrifying conditions can be established. [Author's conclusion.]—Citrus Exp. Stat., Lake Alfred, Fla.

1814. Haas, A. R. C., and Brusca, J. N.
**Nitrate levels for Valencias.**
*Calif. Agric.*, 1956, **10**(11): 8-9, illus.

Valencia oranges were grown in soil and solution cultures at various levels of nitrate. Relatively high concentrations of nitrate resulted in the best growth of trees, but after some years copper deficiency symptoms (exanthema) developed in high-nitrate trees which had received no copper. Leaf-P declined, but P in fruit peel and pulp increased with increasing nitrate concentrations, which suggests that as nitrate levels increase an adequate supply of available P becomes increasingly important.

1815. Haas, A. R. C., and Brusca, J. N.
**Nitrate in lemon soil cultures.**
*Calif. Agric.*, 1956, **10**(12): 9-10, illus.

Nitrate was supplied at various concentrations ranging from 25 to 600 p.p.m. to Eureka lemon trees grown in soil cultures. Growth increased considerably with increases in nitrate concentration up to 250 p.p.m., but above this further increases were small and erratic. Fruit yield was also at its highest with 250 p.p.m., but this was only achieved with a loss in fruit size. The effects of different levels of nitrate on Ca, Mg, K and P in leaves, rootlets, peel and pulp are tabulated.

1816. Pratt, P. F., and Jones, W. W.
**Phosphorus in citrus soils.**
*Calif. Agric.*, 1956, **10**(11): 10.
**Removal and redistribution of phosphorus from soil during twenty-eight years of cropping with citrus.**
*Citrus Leaves*, 1956, **36**(12): 6-7.
**Accumulation of phosphorus.**
*Calif. Citrogr.*, 1957, **42**: 107-8, bibl. 16.

Citrus in most soils of southern California does not respond to P. One explanation for this is suggested by the present study, in which soil-P determinations made in an orchard in 1927 were repeated in 1955. The figures show that significant reductions in P had occurred in the irrigated areas between the trees, but that under the trees P had accumulated in a form more readily available to plants than the original soil-P. P removed by the fruit averaged only 1% of the total soil-P and only accounted for 16% of the P lost in the irrigated middles. Between 5 and 10 times as much P as was lost in the fruit had been absorbed by the trees and about 60% of this had been deposited under the trees as a result of leaf and fruit fall. It is possible that some of the low correlations recorded in the past between soil analysis and leaf composition may have resulted from a failure to recognize this surface accumulation of available elements under trees. [See also *H.A.*, 27: 759 and abstract 1818.]

1817. Miller, R. L.
**Chelated iron restores nutrient balance in citrus.**
*Down to Earth*, 1956, **12**(1): 12-14, illus.

In an old chlorotic grove in Florida treatment with lime until the pH reached 6·3–7·0, followed by the application of 1 oz. of iron as Versene Iron Chelate per tree completely corrected iron chlorosis. Fruit production in the grove was increased from 1–2 boxes per tree to 6–8 boxes and quality also improved.

1818. Pratt, P. F., and Harding, R. B.
**Loss of magnesium from soil.**
*Calif. Agric.*, 1957, **11**(1): 11.
**Fertilizer effect on loss of magnesium from soil.**
*Calif. Citrogr.*, 1957, **42**: 76, 101.
**Effect of fertilizers on loss of magnesium from the soil.**
*Citrus Leaves*, 1957, **37**(2): 10-11.

The analysis of soil samples in a long-term fertility trial at Riverside in 1927 and 1955 [see also abstract 1816] revealed losses of exchangeable Mg in the top 36 ins. of soil ranging from 274 to 1,800 lb./acre. The losses of Mg increased with increases in the amount of fertilizers and gypsum added to the soil. As absorption by the trees and losses in harvested fruit accounted for a comparatively small part of the lost Mg, the major proportion must have been lost through leaching.

1819. Leonard, C. D., Stewart, I., and Edwards, G.
**Effectiveness of different zinc fertilizers on citrus.**
*Citrus Ind.*, 1957, **38**(2): 9-10, 12-15, bibl. 7.

In pot studies two Zn chelates showed a high degree of leaching through soils of various pH levels, whereas zinc sulphate showed little leaching. In a field trial

with Pineapple orange trees on an acid soil, soil applications of zinc sulphate and three Zn chelates induced similar increases on leaf contents of Zn. The highest leaf-Zn contents were found in trees receiving 2 lb. zinc sulphate per tree per application. In a second field experiment a single soil application of 5 lb. zinc sulphate per tree produced a slightly higher Zn content of both spring and summer flush leaves than foliage sprays applied at the rate of 3 lb. zinc sulphate per 100 gal. A mixture of 5 lb. zinc sulphate and 5 lb. calcium chloride increased the Zn content of spring flush leaves to 170 p.p.m. and that of young summer flush leaves to 82 p.p.m.—Fla Citrus Exp. Stat., Lake Alfred. [See also *H.A.*, 26: 3062.]

### *Citrus—climatic factors.*

1820. Koo, R. C. J., and Sites, J. W.
**Results of research and response of citrus to supplemental irrigation.**
*Proc. Soil Sci. Soc. Fla, 1955*, **15**: 180-90, bibl. 3.

The quantity of water lost by mature grapefruit trees through transpiration was calculated from measurements of percolation and evaporation of water from the soil. The average transpiration was 34·2 gal./tree/day throughout the year, ranging from 16 gal./day in February to 53 gal./day in June. A 7-year experiment with Hamlin, Pineapple and Valencia orange trees showed that the effect of irrigation on the internal quality of the fruit was related to the time the irrigation was applied, the frequency of the irrigation in any particular season, and the time at which the variety was harvested. Lowering of the soluble solids and titratable acid contents of the fruit resulting from irrigation applied later than the latter part of August or early September appeared to be largely a dilution effect. Highly significant increases in yield resulted in 2 seasons when these orange varieties were irrigated when in bloom or shortly after petal fall, although this practice has been stated by growers to be detrimental.—Fla agric. Exp. Stats. J.R.L.

1821. Mirimanjan, V. A.
**Some physiological and biochemical symptoms characteristic of frost resistance in citrus plants.** [Russian.]
*Doklady vsesojuz. Akad. seljsk. Nauk*, 1956, **21**(9): 36-9, bibl. 9.

A study was conducted at Soči on frost susceptible lemons and Duncan grapefruit and frost resistant Unshiu and Šiva-Mikan mandarins. It was found that the leaves of frost resistant plants had a greater water retaining capacity, a higher resistance to the reduction of ascorbic acid by low temperatures, and higher amylase activity and contents of albumens and globulins than those of the frost susceptible plants.

### *Citrus—flower and fruit development.*

1822. Fujita, K., and Yagi, T.
**Studies on flower bud differentiation and development in some orange trees. No. 2. (1) The time of flower bud differentiation in Satsuma orange. (2) The time of flower bud differentiation in Navel orange, Valencia, Fukuhara orange, lemon and New Summer orange.** [Japanese, with English summaries 7 and 9 lines.]
*Bull. Kanagawa agric. Exp. Stat. hort. Sect.*, 1956, No. 4, pp. 23-8, 28-32, bibl. 2.

In further anatomical studies in 1955, similar to those previously reported [*H.A.*, 26: 991], flower bud differentiation in Satsuma orange was first visible on March 16. The period of differentiation was longer than in the previous season but differentiation occurred at about the same time in relation to bud burst. The differentiation of flower buds in Washington Navel and Genoa lemon started in mid-December or early January and continued for about 4 months until late March. In Valencia, Fukuhara and New Summer oranges buds started to differentiate in late January, early February and mid-March respectively, and in the last variety the process was not complete by April 10. The lateral buds of Washington Navel and of one other variety developed after the pistil had formed in the main bud. J.R.L.

1823. Varma, T. N. S., and Ramakrishnan, C. V.
**Biosynthesis of citric acid in citrus fruits.**
*Nature*, 1956, **178**: 1358-9, bibl. 3, illus.

In the course of this investigation citrus fruits (*Citrus acida*) were analysed for acidity and citric acid content at different stages of their development. The different organic acids present were determined chromatographically. In the case of fruits having a diameter of 1·5 cm. and greater, citric acid was the predominant acid with small amounts of malic acid, whereas at younger stages of growth succinic acid was the predominant one with small amounts of two other unidentified acids. This shows that the fruit tissues are different from those of leaves or stems where citric acid is detected at all stages of their growth. Further, citric acid formation and accumulation in fruits may not be due to translocation from the leaves but to the conversion of sugars into acids by the enzyme system present in the fruit tissues.—Univ. Baroda.

1824. Mynhardt, C. B.
**Arsenical sprays. Possible effect on size of Valencia fruit in the Sundays River Valley.**
*Citrus Gr*, 1956, No. 273, pp. 1-3.

Calcium arsenate sprays at 1 lb./100 gal. applied to Valencias advanced maturity by 2 to 3 weeks, but did not appear to reduce fruit size.

### *Citrus—diseases and pests.*

(*See also* 1352, 1862i, k-m, o, p, t, u, x, 1863e, i, j.)

1825. Moje, W., Martin, J. P., and Baines, R. C.
**Structural effect of some organic compounds on soil organisms and citrus seedlings grown in an old citrus soil.**
*J. agric. Food Chem.*, 1957, **5**: 32-6, bibl. 26.

A study was made of the effect of saturated and unsaturated alcohols, halides, acids, esters, amides, and some commercial fumigants on the soil organisms and growth of sweet orange seedlings in an old citrus soil. The organisms examined included the citrus nematode, *Tylenchulus semipenetrans*, fungi, and bacteria. It was concluded that high toxicity to these organisms, and citrus, is associated with halides and alcohols containing $\alpha,\beta$-unsaturation. Several halogen derivatives were

more effective against the citrus nematode than some of the commercial fumigants now in use. Some chemicals were found to stimulate growth of *Trichoderma viride*, and indirect biological control of certain pathogenic soil organisms might be achieved by exploitation of this observation. [Authors' abstract.] —Univ. Calif., Riverside.

1826. European and Mediterranean Plant Protection Organisation.
**Report of the working party on tristeza and xyloporosis. (Portici, May 14-16, 1956.)** [English and French.]
[*Publ.*] *Eur. Plant Prot. Org.* [*EPPO*], 1956, pp. 27, bibl. 210, illus.

History, distribution, symptoms and control measures are described. There is considerable evidence that tristeza is due to a single virus with several different strains and belongs to the "non-persistent" class. Seed transmission of xyloporosis has been reported in the U.S.A. Both diseases produce various types of stem pitting.

1827. Reichert, I., and Winocour, E.
**Inverse pitting in xyloporosis and tristeza.**
*Phytopathology*, 1956, **46**: 527-9, bibl. 10, illus.

A form of bark pitting found in Israel on citrus trees that have also the typical symptoms of the disorder originally described as xyloporosis was studied histologically. Comparisons with similar forms of pitting described in California, Florida and Argentina on citrus trees affected by the tristeza (quick decline) virus disease and on trees suffering from other disorders of unknown cause show that this type of bark pitting is not specific for any single virus or cause. This indicates that it may not be a safe procedure to make specific diagnoses on the basis of this particular symptom on citrus. [Authors' summary.]—Agric. Res. Stat., Rehovot. [See also *H.A.*, 26: 4080.]

1828. Olson, E. O., and Shull, A. V.
**Exocortis and xyloporosis—bud-transmission virus diseases of Rangpur and other mandarin-lime rootstocks.**
*Plant Dis. Reptr*, 1956, **40**: 939-46, bibl. 14, illus.

A bark-shelling disease of mandarin-lime rootstocks in Texas, found to be bud-transmissible, has symptoms apparently identical with those described for exocortis virus infection of Rangpur mandarin-lime rootstock in Brazil. Because this disease occurred when tristeza and psorosis viruses were not present and xyloporosis (cachexia) sometimes occurred in its absence, the causal agent of bark shelling of mandarin-limes is probably exocortis virus and differs from the causal agents of tristeza, psorosis and xyloporosis. The varieties and strains found susceptible to exocortis are *Citrus limonia* Osbeck; Rangpur, Ling Mung, Poak Ling Mung, Red Ling Mung, and Kusaie mandarin-limes; and mandarin-lime CPB introductions 7418, 10557, and 72901. Bark-shelling symptoms did not develop on rough lemon rootstock. Comparison of unbudded mandarin-lime, sweet lime, tangelo, Mexican lime, and Morton citrange seedlings with grapefruit on the same rootstocks budded from source trees with and without various disease symptoms warranted these conclusions. In another test the virus causing exocortis of Red Ling Mung mandarin-lime rootstocks occurred in 5 of 8 red grapefruit bud-source trees, 1 of 4 Valencia orange bud-source trees, and in both of 2 Jaffa orange bud-source trees tested; seedling Red Blush grapefruit trees, nucellar Valencia orange, and nucellar Ruby blood orange trees were free of the virus. [Authors' summary.]—Tex. agric. Exp. Stat., Weslaco, and Agric. Res. Serv., U.S.D.A.

1829. Taboada, V. L. [El].
Empleo del metodo histológico (H. Schneider) para determinar "tristeza" en las plantas cítricas en la provincia de Tucumán. **(Use of Schneider's histological method for detecting tristeza in citrus plants in Tucumán province.)**
*Rev. industr. agríc. Tucumán*, 1955, **39**: 76-7, bibl. 12.
El método histológico en la determinación en Tucumán de la "tristeza" de los citrus. **(The histological method of detecting tristeza of citrus in Tucuman.)**
*Idia*, 1956, No. 101, pp. 13-15, bibl. 9, illus.

Sections approximately 8μ thick were cut from the region of union of Jaffa orange scions with Rangpur, Cleopatra, sweet orange and sour orange rootstocks, comparing diseased and apparently healthy trees. Schneider's method of examining the phloem [*H.A.*, 24: 3050] was used for diagnosis. Certain apparently normal tissue modifications associated with sour orange rootstocks were greatly accentuated when tristeza symptoms were present.

1830. Knorr, L. C.
**Suscepts, indicators, and filters of tristeza virus, and some differences between tristeza in Argentina and in Florida.**
*Phytopathology*, 1956, **46**: 557-60, bibl. 8, illus.

Tristeza in Argentina is compared with the disease of the same name in Florida. The production of vein-clearing symptoms in seedlings of Key lime (*Citrus aurantifolia*), the destruction of sweet orange trees on sour orange rootstocks, the occurrence of stem pitting and honeycombing in susceptible tissues, and the presence of a characteristic involvement of vascular tissues at the bud union have suggested that the 2 diseases are identical. On the contrary, differences in host ranges, growth rates of infected plants, and specificity of the stem-pitting reaction suggest that the causal viruses or virus complexes in the 2 areas are not the same. Host-range studies of Argentine tristeza virus disclosed the existence of 4 indicator plants not previously reported, viz., *Afraegle paniculata*, *Pamburus missiones*, *Citrus combava* and *C. hystrix*. Of these, the last mentioned proved also to be an indicator of Florida tristeza virus. *Aeglopsis chevalieri* was found to be a filter plant useful in separating psorosis virus from admixtures with Florida tristeza virus. [From author's summary.]—Fla. Citrus Exp. Stat., Lake Alfred.

1831. Norman, P. A., and Grant, T. J.
**Transmission of tristeza virus by aphids in Florida.**
*Citrus Ind.*, 1957, **38**(1): 5-7, 16, bibl. 20.

The green citrus aphid (*Aphis spiraecola*) was found to transmit tristeza virus from infected Valencia and

Florida sweet seedlings. The black citrus aphid (*Toxoptera aurantii*) was shown for the first time to be a vector of the virus. Improvements in technique have given high ratios of transmission by the melon aphid (*A. gossypii*) and green citrus aphid. Milder virus symptoms were induced after transmission from Meyer lemon to Key lime by the green citrus aphid than by tissue transmission.—Agric. Res. Serv., U.S.D.A., Orlando.

1832. Cohen, M.
**Injury and loss of citrus trees due to tristeza in an Orange County grove.**
*Citrus Ind.*, 1957, **38**(1): 10-13, bibl. 2.

The spread of tristeza was studied in an orange grove in Florida. The number of seriously affected trees increased steadily during the 4 years of observation. Few of the trees on a grapefruit rootstock were affected, whereas a high proportion of those on sour orange showed decline symptoms. Indexing has shown the virus to be present in apparently healthy trees, which did not show histological signs, and it is suggested that the virus may have a long incubation period.

1833. Price, W. C., and Knorr, L. C.
**Kinetics of thermal destruction of citrus tissues in relation to the virus disease problem.**
*Phytopathology*, 1956, **46**: 657-61.

Thermal destruction of citrus buds was studied by immersing short pieces of stem in a water bath and observing necrosis on or near the bud. Psorosis and tristeza viruses both survived heat treatment as long as the buds survived over the range 35–52° C.; psorosis virus survived 45° C. for 240 minutes and 52° C. for 10 minutes; tristeza virus survived 35° C. for 3 days, 45° C. for 180 minutes, and 52° C. for 30 minutes. Thermal killing of citrus buds apparently results from thermal destruction of a protein or enzyme system within cells of the bud. [From authors' summary.]—Fla Citrus Exp. Stat., Lake Alfred.

1834. Zabala, S.
Pérdidas de las semillas de citrus en las siembras en almácigo. **(Losses of citrus seeds from nursery plantings.)**
*Idia*, 1956, No. 101, pp. 31-3.

Resistant, susceptible and highly susceptible citrus varieties are named with regard to damping-off caused by *Fusarium* and *Rhizoctonia* spp. The disease was accentuated by lack of shade as well as by high temperatures and overwatering. Immersion for ½ hr in 0·125% mercury oxyalkylate was lethal to sweet orange, and considerably damaged rough lemon seeds, but application of the same solution to nursery soil gave good control of damping-off without seed injury. Seed disinfection with ferbam did not check the disease. Watering the soil with sulphuric acid or ferrous sulphate at 1% increased seedling mortality.—Estac. Exp. Villa Alberdi, Tucumán, Argentina.

1835. Ciccarone, A.
Applicazioni di calciocianamide agli agrumi ed infezioni di "mal secco". **(The application of calcium cyanamide to citrus and mal secco.)**
*Riv. Agrum.*, 1956, **1**: 361-7, bibl. 8.

Ten small potted plants of sour orange were given calcium cyanamide, or sulphate of ammonia containing equivalent amounts of N, and were then either inoculated with *Deuterophoma tracheiphila* or were exposed for several months to infection by the mal secco fungus. Plants thus treated developed as much infection as 10 untreated plants. The application of N would seem to have slightly accelerated the appearance of disease symptoms following inoculation.

1836. Spencer, H., and Selhime, A. G.
**Control of purple scales, whiteflies and citrus red mites on grapefruit trees with phosphorus insecticides.**
*Citrus Mag.*, 1956, **19**(4): 12-13, 22, bibl. 3.
*Citrus Ind.*, 1957, **37**(11): 12-13, 23, bibl. 3.

In 3 years' trials malathion and demeton have been compared with parathion plus ovex for the control of purple scale (*Lepidosaphes beckii*), citrus red mite (*Metatetranychus citri*) and whitefly (*Dialeurodes citri* and *D. citrifolii*) on Ruby grapefruit trees. The results suggest that satisfactory commercial control of heavy infestations of purple scale and citrus red mite may be obtained by substituting malathion for the usual parathion plus ovex sprays. Demeton is, at present prices, too expensive for commercial use.

1837. Smirnoff, W.
Une nouvelle espèce d'acarien, *Lorryia* sp. (Tydeidae, Kramer) vivant sur citrus au Maroc. **(A new species of mite, *Lorryia* sp., living on citrus in Morocco.)**
*Fruits et Prim.*, 1956, **26**: 330-2, illus.

This species of *Lorryia*, new to Morocco, normally feeds on secretions from *Saissetia oleae*, but has been found damaging young citrus fruits. It is not attacked by the predators of other citrus mites and has appeared on trees treated with thiophosphoric esters. Dusting with sulphur is recommended for control in early spring. In summer this is replaced by a spray of butylphenoxyisopropyl chloroethyl sulphite at 60 c.c./100 l. water. For simultaneous control of *S. oleae* this is mixed with 1·5–2% white oil.—Serv. Défense Vég., Rabat, Morocco.

1838. Botham, J. R.
**Red scale, a threat to the Upper Murray citrus industry.**
*J. Dep. Agric. S. Aust.*, 1956, **60**: 122-4, illus.

Measures to control and eradicate red scale [*Aonidiella aurantii*] include malathion sprays (5 lb. 25% w.p. per 100 gal.) at 6-weekly intervals during the winter, and in the spring 1 : 40 white oil sprays followed by cyanide fumigation 14 days later. Where only a few trees are infested, they may be pollarded, sprayed with 1 : 30 white oil and whitewashed. [See also *H.A.*, 26: 2119.]
J.R.L.

1839. Vergani, A. R.
Contribución a la lucha contra la *Aonidiella aurantii* (Mask.). **(Contribution to the control of *Aonidiella aurantii*.)**
*Idia*, 1956, No. 101, pp. 20-1.

Results are given from comparative trials for control of citrus red scale with light and heavy oils, parathion, E 605, EPN, Systox, diazinon, polysulphides of potassium and barium, calcium cyanide, and mixtures of oil with parathion or E 605. The insecticides finally

recommended are parathion and oils. Notes are given on their application under local conditions.—Estac. Exp. Citríc., Concordia, Entre Ríos, Argentina.

1840. Zeck, E. H.
**The "Dicky Rice" weevil.**
*Agric. Gaz. N.S.W.*, 1956, **67**: 430-1, illus.
The "Dicky Rice" weevil, *Maleuterpes spinipes*, attacks citrus fruits soon after they are set and continues to damage them for about 3 months, marking the surface of the fruit with a network of irregular furrows. Control can be obtained with 0·05% DDT applied in the spring or by 1¼ lb. cryolite to 40 gal. water, with 1 qt. white oil emulsion added, applied when the weevils are active. J.R.L.

1841. Vergani, A. R.
Nuevos resultados en la determinación de aceites minerales insecticidas no fitotóxicos. **(Further results from tests with non-phytotoxic mineral oil insecticides.)**
*Idia*, 1956, No. 101, pp. 35-6.
Results are briefly summarized from trials with different types of mineral oil and different application times, comparing only the effects on the trees. In general, light and medium oils applied from January to March were harmless.—Estac. Exp. Citríc., Concordia, Entre Ríos, Argentina.

### *Citrus—fruit storage and juice composition.*

(*See also* 1162, 1183, 1806, 1862h, 1863a, g.)

1842. Ildis, P., and Travert, J.
Possibilités de refrigération de la Clémentine. **(Possibilities of cold storing the Clementine.)**
*Cah. Lab. Froid Cons., Ain-Sebaa, Casablanca*, 1956, No. 3, pp. 5, from abstr. in *Food Sci. Abstr.*, 1956, **28**, No. 2337.
In clementines stored at temperatures ranging from −2° to 15° C., and 80% relative humidity, loss of weight was 5 to 10% per month, increasing generally with temperature. Colour remained too yellow at −2° and 0° C., and was normal, or sometimes too deep, at 5°, 10°, and 15° C. After 2 months, the flavour was best in fruits stored at 5° C. Decay increased in the third month. Content of soluble solids increased slightly, and acidity remained constant, at all temperatures; rate of respiration increased slowly during storage; at maturity it ranged from 8·8 mg. of $CO_2$ per hour per kg. of fresh fruit at 2° C., to 40 mg. at 20° C.

1843. Fujita, K., Mukasa, S., and Koto, M.
**Experiments on the keeping quality of Satsuma oranges in relation to temperature and moisture. Experiments on various storage methods No. 4.** [Japanese, with English summary 9 lines.]
*Bull. Kanagawa agric. Exp. Stat. hort. Sect.*, 1956, No. 4, pp. 1-5, bibl. 7, illus.
Satsuma oranges were pre-cooled at 5° C. and 75% or 85% R.H. until their weight had decreased by 2, 3, 4 or 5%, and their subsequent long-term storage behaviour was studied. It was found that the R.H. during pre-cooling did not affect the amount of fruit rot, but quality and appearance were superior when pre-cooling was done at 75% R.H. for the short period necessary to reduce fruit weight by 3%. [For earlier report see *H.A.*, 26: 1032.] J.R.L.

1844. Fujita, K., Mukasa, S., and Koto, M.
**Experiments in coating Satsuma oranges with wax before storage. (Preliminary report.)** [Japanese, with English summary 9 lines.]
*Bull. Kanagawa agric. Exp. Stat. hort. Sect.*, 1956, No. 4, pp. 6-12, bibl. 4, illus.
When Satsuma oranges were coated with a wax emulsion in December their loss of weight during storage was small and their appearance was good, but the composition of the juice was inferior to that of unwaxed fruit. Fruit waxed during March had a poor appearance when marketed. Machine waxing increased the amount of fruit rot, although this was less pronounced when citrol was added. J.R.L.

1845. Ildis, P., and d'Ersu, A. P.
Étude des conditions de conservation de l'orange Valencia. Expériences de 1952 et 1954. **(A study of storage conditions for the Valencia orange. Experiments in 1952 and 1954.)**
*Cah. Lab. Froid Cons., Ain-Sebaa, Casablanca*, 1956, No. 3, pp. 9, from abstr. in *Food Sci. Abstr.*, 1956, **28**, No. 2336.
Valencia oranges were stored at different temperatures for periods of up to 10 weeks. From the results of determinations of loss of weight, changes in colour and flavour, percentage of decay and contents of soluble solids and acid, 4° C. is recommended as probably, on balance, the best storage temperature.

1846. Grierson, W., and Patrick, R.
**The sloughing disease of grapefruit.**
*Proc. Fla St. hort. Soc.*, reprinted in *Citrus Ind.*, 1957, **38**(1): 8-9, 16, bibl. 20, illus.
Observations have shown that sloughing has occurred only on red and pink grapefruit, and is confined to very early pickings. Cold storage checks or controls it. The evidence indicates that sloughing originates in the grove, and that moisture conditions may be a factor in its incidence. Losses may be reduced by prompt pre-cooling followed by refrigeration of the fruit in transit.—Fla Citrus Exp.Stat., Lake Alfred. [See also *H.A.*, 26: 1033.]

1847. Gunther, F. A., and others.
**Ammonium succinate and inorganic ammonia-producing materials as fungicides for the control of blue-green mold decay of citrus fruits.**
*Phytopathology*, 1956, **46**: 632-3, bibl. 3.
Among compounds screened for the slow release of ammonia ammonium succinate was outstanding for decay control and was also easy to use. Easily available ammonium-containing compounds were mixed with a weakly-basic substance and shredded asbestos and made into pellets. In cartons of inoculated Valencias, the presence of these pellets markedly reduced decay during incubation for 1 week at 68° F.

1848. Moreau, C.
Les composés organiques du bore (albotènes), leur intérêt dans le traitement des agrumes en entrepot. **(Organic boron compounds, their value for treating citrus fruit for storage.)**
*Fruits d'Outre Mer*, 1956, **11**: 375-9, bibl. 6.

In laboratory tests oranges and lemons treated with organic B compounds before coming in contact with diseased fruits were protected from infection. After storage oranges which had been dipped in an aqueous solution of organic B showed a lower percentage of decay and retained a higher degree of fruit soundness than did untreated fruit. The use of this method of fungicide protection reduced the loss of weight after 3 months' storage from 10·3% to 0·9%.

1849. Cuillé, J.
Quelques formules utilisables pour la protection des agrumes contre les *Penicillium*. **(Some preparations suitable for protection of citrus fruits against *Penicillium* spp.)**
*Fruits d'Outre Mer*, 1956, **11**: 479-80, bibl. 11.

Superpentabor, a product containing 5% sodium pentaborate and a wetting agent, was more powerful and more lasting in its effect on *Penicillium* on oranges than Sacinol, a preparation of sodium orthophenylphenate. Loss of untreated fruit was lower than that of fruit washed in water and brushed.—I.F.A.C.

1850. Patron, A., and Swinzow, H.
Influence de la matière première et les méthodes de traitement sur la qualité des jus d'agrumes au Maroc. **(Effect of raw material and methods of treatment on the quality of citrus juices in Morocco.)**
*Fruits d'Outre Mer*, 1956, **11**: 419-28, bibl. 4, and 471-8.

Detailed studies on fresh and preserved juice of various Moroccan oranges and grapefruit are reported. For a good quality preserved product the maturity index of the oranges (refractometric extract/acidity) should be 9–10. Valencia Late and Hamlin were the best and Cadenera and Pajarito were good varieties, but Washington Navel and Tarocco were unsuitable, and indigenous varieties were generally inferior. Marsh Seedless grapefruit was very suitable for juice extraction and Moroccan juice was rated higher than American. The maturity index should reach 6–6·5 before extraction.—I.F.A.C., Ain-Sebaa.

1851. Swift, L. J., and Veldhuis, M. K.
**Composition of commercial, segment, and peel juices of Florida oranges.**
*J. agric. Food Chem.*, 1957, **5**: 49-52, bibl. 10.

Segment juice, commercial juice and peel juice were compared throughout a season. Peel juices were always highest in pH, Brix-acid ratio, soluble pectic substances, ascorbic acid, flavonoids, diacetyl and colour, and lowest in acidity and fluorescence. Peel juices were usually highest in soluble solids, specific gravity and viscosity. During the early part of the season, sucrose was lowest and reducing sugars were highest in peel juices.—U.S. Citrus Prod. Stat., Winter Haven, Fla.

### *Dates.*

(*See also* 1712, 1862a.)

1852. Wertheimer, M.
Recherches et observations sur la plantation des rejets de palmiers-dattiers. (*Phoenix dactylifera* L.) dans les Ziban (région de Biskra). **(Studies and observations on planting date palm suckers in the Ziban (Biskra region).)**
*Fruits d'Outre Mer*, 1956, **11**: 481-7.

The primary requisite for success was careful severance, forming a smooth wound of minimal size. In experiments with suckers of different weights, those between 17 and 25 kg. were most satisfactory, the best weight being 20–22 kg. Palms grown from suckers of this size showed promise of early bearing.

1853. Wertheimer, M.
Essais de limitation par ciselage de la production du palmier-dattier Deglet-Nour dans les Ziban. **(Tests on thinning for limiting the cropping of Deglet-Nour date palms in the Ziban region.)**
*Fruits d'Outre Mer*, 1956, **11**: 429-33, illus.

Strands in each bunch of Deglet-Nour date palms were thinned by a third, at the beginning of May or at the end of June and beginning of July. Thinning in July improved quality, but the quantity of fruit produced was reduced by about 7%. Thinning in May increased the amount of fruit slightly but not significantly, and improved quality and earliness.—Stat. exp. agric. Aïn ben Noui.

### *Macadamias.*

1854. Cooil, B. J., Nakata, S., and Awada, M.
**Nutrient requirements of macadamia varieties.**
*Hawaii Fm Sci.*, 1956, **5**(2): 2-3, illus.

Studies of growth responses and leaf composition involving 5 macadamia varieties have shown that varieties differ in their ability to absorb N, P, K, and Mg. As sufficiency levels, as determined by leaf analysis, appear to be similar for all varieties, the ideal solution would be to supply a separate NPK formulation for each variety. This would, however, be impracticable in mixed plantings, and a compromise is suggested, in which only two fertilizer schedules are used on young trees growing on rockland soils relatively low in nutrients, namely, 5 : 9 : 19 for the varieties Keauhou and Kakea and 5 : 10 : 10 for Nuuanu, Kohala and Pahau. These dressings should be applied twice a year in amounts of 13 to 16 oz. per inch trunk diameter per application and should be supplemented on two other occasions by sulphate of ammonia applied at 3 to 5 oz. per inch diameter per application.

### *Olives.*

(*See also* 1084q, 1862f, j, z, 1986.)

1855. de la Rocha G., G.
Ensayo de diversos tratamientos en la semilla de olivo. **(Trial with different treatments of olive seeds.)**
*Inf. mens. Estac. exp. agric. La Molina*, 1956, **30**(345): 17-20, illus.

In each treatment 300 g. of olive stones were used.

The numbers of plants obtained were: 143 from 5 hours' soaking in 5% sodium carbonate; 120 from cracking the stones; 101 from 6 hours' soaking in 0·5% potassium hydroxide; 82 from similar use of sodium hydroxide; 20 from complete removal of the stones and 6 from 48 hours' soaking in 2% sulphuric acid. Treatment with sodium carbonate, or cracking or removal of the stones resulted in germination after 2 months, whereas seeds from the other treatments took approximately 3 months.

1856. NORO, K.
**Effects of the soil reaction and nutrient elements on the growth of the olive. I. Studies on the soil reaction in relation to the development of the olive in pot culture.** [Japanese, with English summary ¼ p.]
*Tech. Bull. Kagawa agric. Coll.*, 1956, **7**: 253-60, bibl. 13, illus.

Four-year-old Mission olive trees were planted in pots, in which the soil had been treated with sulphur to reduce the pH from 7·0 to 6·0, 4·7, 3·5 or 3·2, or with calcium sulphate to reduce it to 6·5. At pH 3·5 and 3·2 mineral deficiency symptoms appeared in the leaves after two months, although sufficient nutrients were present in the soil and exchangeable Ca was maintained at an adequate level. It is concluded that in these cases the roots had ceased to function normally. The plants grown in the soil of pH 4·7 were also less healthy than those grown in soils of higher pH. J.R.L.

1857. DEL CAMPO, E.
La lucha colectiva contra las plagas del olivo. **(Collective control of olive pests.)**
*Bol. Oleic. int.*, 1956, **6**(34): 11-27.

Organized control measures are briefly mentioned as regards France, Greece and Portugal and are reported in detail for different regions of Spain. Special reference is made to thrips (*Liothrips oleae*), olive fly (*Dacus oleae*) and leaf spot (*Cycloconium oleaginum*).

1858. GEORGHIOU, G. P.
**Olive-leaf spot disease in Cyprus and its control.**
*World Crops*, 1957, **9**: 63-5, bibl. 4, illus.

In experiments carried out during 1955–56 with 10 : 10 : 100 bordeaux mixture one application on October 20 reduced the incidence of olive-leaf spot (*Cycloconium oleaginum*) by 92%. A second treatment increased control only slightly. Applications in late January and late March had little effect. A common local variety Ladoelia was found to be more susceptible to the disease than several introduced varieties.—Dep. Agric., Nicosia.

1859. GONZÁLEZ C., H., AND OTHERS.
Control de las hormigas. **(Control of ants.)**
*Agric. téc. México*, 1955, **1**(2): 38-9.

Excellent control of red ants (*Pogonomyrmex* sp.) in an olive grove was obtained with chlordane, aldrin or dieldrin, at the rate of 2·5 g. pure insecticide per nest. DDT and BHC were less satisfactory.

1860. SCHMIDT DE GIL, J., AND FREIXAS, A. A.
Susceptiblidad al enranciamento de algunos aceites de oliva. **(Tendency of some olive oils to become rancid.)**
*Rev. Fac. Cien. agrar., Mendoza*, 1954, **4**(2): 15-38, bibl. 20, illus.

Oil from the variety Arbequina tended to become rancid more rapidly than that from Frontoio or Criolla. The time taken was dependent on the initial peroxide index.

### *Persimmons.*

(*See also* 1144.)

1861. WATANABE, T., AND SHIGETA, T.
**Studies on the practical use of polyethylene bags and vinyl film. (No. 1.) Experiments on the removal of astringency and storage of Japanese persimmon fruits.** [Japanese, with English summary 10 lines.]
*Bull. Kanagawa agric. Exp. Stat. hort. Sect.*, 1956, No. 4, pp. 38-42, bibl. 8, illus.

Experiments with Yokono, Hiratane, Yotsumizo and other varieties of Japanese persimmon have shown that storage for 15 days in polythene bags or for 19–20 days in vinyl film is needed to remove astringency. Treatment with 50 p.p.m. 2,4-D or 20 p.p.m. 2,4,5-T prevented blackening of the calyx, but with fruit kept in polythene bags the use of chemicals did not appear to be necessary. J.R.L.

### *Noted.*

1862.

a ALI, K. T., AND OTHERS.
**Macerated dates and ground date stones as feeds for fattening sheep.**
*Emp. J. exp. Agric.*, 1956, **24**: 323-30, bibl. 2.

b BANFI, A.
Costo de implantación de una quinta cítrica en Concordia. **(Cost of establishing a citrus orchard in Concordia [Argentina].)**
*Idia*, 1956, No. 101, pp. 1-12.
Costs and returns for the first 7 years of a 50-ha. orchard.

c BANFI, A.
Economía cítrica. **(Citrus economics.)**
*Idia*, 1956, No. 101, pp. 50-2.
In Argentina.

d BANFI, A., AND BEÑATENA, H. N.
Colección de especies y variedades del género *Citrus* y afines en la Estación Experimental de Concordia. **(Collection of species and varieties of *Citrus* and related genera at the Concordia Experimental Station.)**
*Idia*, 1956, No. 101, pp. 42-9, bibl. 2, illus.

e BIOLOGICAL BRANCH, N.S.W. DEPARTMENT OF AGRICULTURE.
**Brown spot of passion fruit.**
*Agric. Gaz. N.S.W.*, 1956, **67**: 490, 493, illus.
*Alternaria passiflorae* and its control by pruning and copper sprays.

f BONNET, P.
Reconstitution des olivaies françaises détruites par les gelées de Février 1956. **(Reconstitution of French olive groves destroyed by the frosts of February, 1956.)**
*Oléagineux*, 1956, **11**: 359-67, illus., and 1957, **12**: 21-6, illus.
Recommendations to cover different degrees of damage.

g BOYCE, A. M.
**Listing and description of avocado projects at University of California Citrus Experiment Station.**
*Yearb. Calif. Avoc. Soc. for 1956*, pp. 113-19.

h BUTZLER, G. J., LUCE, E. N., AND WING, R. E.
**Determination of residual *p*-chlorophenyl *p*-chlorobenzenesulfonate in orange pulp.**
*J. agric. Food Chem.*, 1957, **5**: 42-4, bibl. 7, illus.

i CALAVAN, E. C.
**Citrus canker—a bacterial disease caused by *Xanthomonas citri*.**
*Bull. Calif. Dep. Agric.*, 1956, **45**: 259-62, illus.
Symptoms and eradication programmes.

j DEL CAMPO, E.
El estado de los olivares en España. (**The state of Spanish olive groves.**)
*Bol. Oleic. int.*, 1956, **6**(34): 51-8.
Seasonal operations and nutrition. [See also *H.A.*, 27: 838j.]

k CHILDS, J. F. L.
**Xyloporosis in relation to certified citrus budwood.**
*Citrus Ind.*, 1956, **37**(11): 6-7, bibl. 8.
The position in Florida reviewed.

l COOPER, C. M.
**Control of red-scale of citrus.**
*J. Dep. Agric. S. Aust.*, 1956, **60**: 226-7.
Notes on a successful, co-operative, contributory scheme in the Berri district.

m DUCHARME, E. P., AND BIRCHFIELD, W.
**Physiologic races of the burrowing nematode.**
*Phytopathology*, 1956, **46**: 615-16, bibl. 4.
Two races found, one attacking citrus and bananas, the other bananas only.

n GERRITSEN, C. J.
De feyoa, een nieuw cultuurgewas? (**Feijoa, a new commercial crop?**) [English summary 14 lines.]
*Meded. Dir. Tuinb.*, 1956, **19**: 889-94, bibl. 2, illus.
Being tried out in Holland.

o HARDING, R. B., MILLER, M. P., AND FIREMAN, M.
**Leaf burn on sprinkled citrus.**
*Calif. Agric.*, 1957, **11**(1): 9-10, illus.
See *H.A.*, 26: 3066.

p HART, W. H.
**Spreading decline of citrus caused by the burrowing nematode.**
*Bull. Calif. Dep. Agric.*, 1956, **45**: 263-7, bibl. 22, illus.
Florida experience reviewed.

q HODGSON, R. W.
**Current avocado research on the Los Angeles campus.**
*Yearb. Calif. Avoc. Soc. for 1956*, pp. 107-12.
Brief notes on research in progress and planned.

r HOOS, S.
**Lemon industry in California.**
*Calif. Agric.*, 1956, **10**(11): 2, 14.
Effectiveness of state marketing order discussed.

s JOHNSTON, J. C., AND FROLICH, E. F.
**Avocado propagation.**
*Yearb. Calif. Avoc. Soc. for 1956*, pp. 89-98.
Raising rootstocks and budding and grafting described.

t KLOTZ, L. J.
**Mal secco disease of citrus.**
*Bull. Calif. Dep. Agric.*, 1956, **45**: 234-7, bibl. 3, illus.
A review.

u KLOTZ, L. J.
**Protecting young trees against brown rot gummosis.**
*Calif. Citrogr.*, 1956, **42**: 42.
*Citrus Leaves*, 1957, **37**(2): 11, 27.
Suggestions on rootstocks, heat treatment, planting, fertilizers and surgery.

v LAWRENCE, F. P., AND NORRIS, R. E.
**Field observations of several methods of managing closely set citrus trees.**
*Citrus Ind.*, 1957, **38**(2): 19-21, 24-6.
Methods of hedging, heading back, removing surplus trees and topping.

w LEE, B. W.
**Use of manures in citrus orchards.**
*Citrus Leaves*, 1956, **36**(12): 8-9.
**Use of manures on citrus.**
*Calif. Citrogr.*, 1956, **42**: 58-9.
Value and uses of cattle and poultry manure discussed.

x MALLO, R. G., AND TURICA, A.
Lucha biológica contra las plagas de los citrus en el país. (**Biological control of citrus pests in Argentina.**)
*Idia*, 1956, No. 101, pp. 29-31.
*Tetrastichus giffardianus* against fruit flies and *Rhodolia cardinalis* against cottony cushion scale.

y MOORE, P. W., AND NAUER, E.
**Declining yields in oranges.**
*Calif. Agric.*, 1957, **11**(1): 13-14.
Results of survey in California [see *H.A.*, 25: 3175] indicate several causes.

z PANERO, M. S.
Note sull'olivicoltura ligure dal 1800 al 1847. (**Notes on olive cultivation in Liguria from 1800 to 1847.**)
*Riv. Fruttic.*, 1956, **18**: 445-51, illus.

1863.

a PATRON, A.
Essais de conservation d'oranges par ensilage. **(Experiments on preservation of oranges by ensilage.)**
*Fruits et Prim.*, 1956, **26**: 335-40, illus.
Successful ensilage of immature oranges from locust-damaged trees.

b REUTHER, W.
**The Florida avocado industry.**
*Yearb. Calif. Avoc. Soc. for 1956*, pp. 120-3.
Booth 8, Lula, Waldin and Booth 7 account for 44% of the crop.

c ROUNDS, M. B.
**Protection of newly planted avocado trees.**
*Yearb. Calif. Avoc. Soc. for 1956*, pp. 135-8, illus.
Methods of planting and protection from sunburn, rodents and frost.

d SINGH, P., AND SRIVASTAVA, J. G.
**On the habitual production of bi-coccus fruits in *Litchi chinensis* Sonn.**
*Sci. and Cult.*, 1956, **22**: 238-9, illus.

e SMITH, W. P. C.
**Parasitic and non-parasitic diseases of citrus and their control in West Australian orchards.**
*Citrus News*, 1956, **32**: 87-91.
Short review of the present position.

f SMOYER, K. M.
**Pruning avocado trees.**
*Citrus Leaves*, 1956, **36**(11): 15.
Observations and suggestions.

g SOKOLOFF, B., AND OTHERS.
**Citrus Vitamin P (citrus bio-flavonoids).**
*Citrus Ind.*, 1956, **37**(12): 9-13, bibl. 45, illus.
Medical value of, and bio-assay for, vitamin P.

h STOREY, W. B.
**The lychee—with remarks concerning its status in California.**
*Yearb. Calif. Avoc. Soc. for 1956*, pp. 57-67, bibl. 5, illus.
Prospects not very promising.

i TAYLOR, O. C., AND OTHERS.
**Pest control sprays on oranges.**
*Calif. Agric.*, 1956, **10**(11): 11.
See *H.A.*, 27: 794.

j VERGANI, A. R.
Calendario de pulverizaciones para citrus. Principales plagas y enfermedades de los citrus del litoral y su combate. **(Spraying calendar for citrus. Chief pests and diseases of citrus in the coastal region and their control.)**
*Idia*, 1956, No. 101, pp. 22-8.
In Argentina.

k VOGEL, R.
Teneur en huile de quelques variétés d'avocatiers cultivés au Maroc. **(Oil content of some avocado varieties grown in Morocco.)**
*Fruits d'Outre Mer*, 1956, **11**: 384-6, illus.
In 4 varieties the oil ranged from 11·57 to 17·75%.

## TROPICAL FRUIT AND PLANTATION CROPS.

### *General.*

(*See also* 1004, 1090, 1183, 1388-1390, 1786, 1960z, 1962, 1989, 1990, 1995, 1997-1999, 2008g, o, q, r.)

1864. LING, P., AND LING, R.-S.
**The classification of evergreen fruits in Taiwan.** [English, with Chinese summary.]
*Mem. Coll. Agric. Nat. Taiwan Univ.*, 1956, **4**(2): 95-136, bibl. 15.
A classification, with a key, is given of the tropical and subtropical fruits grown in Taiwan. Forty-one families containing 79 genera with many species are briefly described. J.R.L.

1865. OPPENHEIMER, C.
**Study tour on subtropical fruit growing and research to India and Ceylon.**
*Special Bull. Rehovot agric. Res. Stat.* **3**, 1956, pp. 60.
In his introduction the author states that the main purpose of the tour was to obtain information on varieties of mango and banana, their methods of cultivation, and research work being done on them. In addition observations were made on many other fruit trees and plantation crops, including citrus fruits, jackfruit, guava, litchi, sapodilla, papaw, cashew, phalsa (*Grewia asiatica*), ber (*Zizyphus mauritiana*), grape, apple, pear, plum, and coconut. Many mango varieties were selected, and have since been introduced, for trial in Israel, features of particular interest being flavour, keeping quality and cold resistance. Among bananas the sub-acid types known as Poovan, Lal Velchi or Champa should be of particular interest to Israel, as might the Bombay method of growing dwarf bananas very intensively to obtain a single heavy crop.

1866. BOLLE-JONES, E. W.
**A glasshouse suitable for physiological investigations on plants grown in the tropics.**
*Emp. J. exp. Agric.*, 1956, **24**: 331-9, bibl. 3, illus.
The design and structure of a glasshouse suitable for physiological experiments under tropical climatic conditions are described. The glasshouse is partially opensided, has a jack roof, and is supported by aluminium-alloy angle framework. All the metal parts employed, except for some iron-wire network, are of either aluminium or aluminium alloy. The glasshouse was easy to construct and requires the minimum of maintenance. The internal atmosphere of the glasshouse had lower maximum and higher minimum temperatures and a lower humidity than an adjacent area outside used for pot experiments. The glasshouse proved to be satisfactory for experimentation with

rubber seedlings. Contamination of plants by rust has been practically eliminated by the use of aluminium-alloy framework; consequently the glasshouse has proved most suitable for the production of micro-nutrient-element deficiency symptoms of rubber seedlings grown in sand culture. The design of the house has proved satisfactory and there has been no evidence, during its two years of use, of any excessive strain or defect in its constructional design. [From author's summary.]—Rubber Res. Inst. Malaya.

1867. Wolcott, G. N.
**Resistance by plant tissue high in silica to injury by cyanide and marine borers.**
*J. Agric. Univ. P.R.*, 1956, **40**: 204-5, bibl. 1.

A bait consisting of steak and potassium cyanide used to poison the coffee shade-tree ant (*Myrmelachista ramulorum*) was found to damage and sometimes kill *Inga* shade trees when applied to the bark, although it has previously been applied without causing damage to the bark of *Ficus laevigata*. The difference is attributed to the high silica content of the *Ficus* bark.
J.R.L.

1868. Deighton, F. C.
***Diseases of cultivated and other economic plants in Sierra Leone.***
Govt. Printing Dep. Sierra Leone, revised 1955 (issued 1956), pp. 76, 5s.

This bulletin, which is intended primarily for the use of Agricultural Officers, opens with a short general account of the organisms causing plant diseases and methods of prevention and control. Concise notes are then given on the separate diseases and their control on numerous host plants arranged in the following groups: Cereals, Plantation crops and fruit trees, Other agricultural crops including cover crops and vegetables, Forest and shade trees, Fodder grasses, and Ornamental plants.

## *Bananas.*

(*See also* 1959b, j, 1960t, 1961a, g, i.)

1869. Kebby, R. G., and Eady, C. A.
**Supplementary watering of bananas.**
[*Publ.*] *N.S.W. Dep. Agric.*, 1956, pp. 16, illus.

It is stated that "no single practice carried out on New South Wales banana plantations will increase production to the same extent as supplementary watering". In most years there is a lack of soil moisture in the late winter, spring and early summer which affects sucker production adversely and encourages premature fruit ripening. This bulletin summarizes the advantages of irrigating and provides useful guidance on such installations as pumps, storage dams, and the lay-out of piping and sprinkler units.

1870. Sundararaj, D. D.
**A contribution to the morphology of fruits—the edible banana.**
*South Indian Hort.*, 1956, **4**: 13-16, bibl. 4, illus.

Morphological and anatomical changes occurring during the development of the banana fruit are described. Keeping quality appears to vary among varieties according to the histology of the skin and the chemical composition of the pulp.

1871. Berrill, F. W.
**Bunch covers for bananas.**
*Qd agric. J.*, 1956, **82**: 435-9, illus.

Experiments have shown that the appearance of fruit bunches (winter ratoon) under plastic covers is outstandingly superior to that of unprotected bunches. The skin is lighter in colour, softer in texture and free from blemishes. The fruit is ready a fortnight earlier, and the fingers fill more evenly, often producing a 10% increase in the weight of the total crop. The colour of the plastic cover is immaterial. In the case of Lady Finger and other tall varieties, where the bunch is more exposed than in Cavendish and Mons Mari, plastic covers increase the risk of sunburn; hessian covers do not have this effect, but they do not accelerate bunch maturity. Bunches are best covered when the last fruit bract has lifted. J.R.L.

1872. Cuillé, J., and Guyot, H.
Les traitements aériens en bananeraie contre *Cercospora musae* (Note préliminaire). **(Aerial treatments in a banana plantation against *Cercospora musae* (Preliminary note).)**
*Fruits d'Outre Mer*, 1956, **11**: 435-41, bibl. 12, illus.

The use of helicopters and aeroplanes for large scale spraying is discussed. Preliminary trials suggest that aerial application may be more economic than ground application.—I.F.A.C., Guadeloupe.

1873. McFarlane, G. C.
**Marketing New South Wales bananas.**
[*Publ.*] *N.S.W. Dep. Agric.*, 1955, pp. 46, bibl. extensive in text, illus.

This publication is a revised edition of articles originally published in *Rev. Marketing agric. Econ.*, 1951, Vol. 19, Nos. 1, 2 and 3. Although bananas have only been cultivated on a commercial scale in New South Wales since 1912 they now rank second to citrus in value of production. The following aspects of the industry are here discussed: Acreage trends, size and economic life of plantations, production trends, yields per acre, organization of the industry, the Banana Marketing Board (1935–1938), attempts to re-establish a marketing organization, distribution problems, scientific ripening, restrictions on production, restrictions on market supplies, variations in supplies and prices, distribution costs, movements in wholesale and retail prices, possibilities of broadening the market for bananas, and the economic outlook for the industry.

1874. Huet, R.
Note sur la signification biochimique de la dureté dans le cas de la pulpe de la banane. **(A note on the biochemical significance of firmness of flesh in the banana.)**
*Fruits d'Outre Mer*, 1956, **11**: 395-9, bibl. 6.

Flesh softening of bananas after cutting appears to be related to the production of compounds insoluble in alcohol, viz. cellulose, hemicellulose, pectins and amidon. Flesh firmness appears to be related to the polymerization of soluble carbohydrate molecules in the banana.—I.F.A.C., Foulaya.

1875. TSALPATOUROS, A.
**La banane chez le mûrisseur. V. VI. VII. (The banana in the ripening chambers. V, VI and VII.)**
*Fruits d'Outre Mer*, 1956, **11**: 401-4, 447-53, and 491-6, bibl. 1, illus.
In Part V the author discusses the time factor as applied to the ripening of bananas in storage from the time of cutting until the fruits are ripe. Theoretical and practical examples are given of the use of the time factor. Part VI is concerned with the role of oxygen within the ripening fruit with special reference to its effect on carbon dioxide emission. The emission of carbon dioxide during storage at different temperatures is discussed in Part VII. Diagrams show the lay-out of flues and sprinklers for conserving and circulating carbon dioxide in chambers arranged in various ways. [For earlier parts see *H.A.*, 26: 3127 and 27: 855.]

1876. TAGER, J. M.
**The role of the pentose cycle in the ripening banana.**
*S. Afr. J. Sci.*, 1956, **53**: 167-70, bibl. 12.
The effect of sodium fluoride, an inhibitor of the Embden-Meyerhof-Parnas pathway, on the respiration of banana pulp tissue slices was investigated. During the preclimacteric stage fluoride did not cause any inhibition. Shortly after the beginning of the climacteric rise in respiration, a steadily increasing inhibition of the respiration of the slices was obtained. The increase in inhibition continued after the climacteric peak had been reached. The Thunberg technique was employed to test the ability of dialyzed extracts of banana pulp to metabolize intermediates of the Embden-Meyerhof-Parnas pathway and of the pentose cycle. Extracts of preclimacteric bananas metabolized glucose-6-phosphate, glucose-1-phosphate and ribose-5-phosphate, but not hexosediphosphate. Extracts of postclimacteric bananas metabolized ribose-5-phosphate hexosediphosphate and glucose-6-phosphate. These results indicate that the pentose cycle may be operative in the respiration of the preclimacteric banana, and that, near the beginning of the climacteric rise, the respiration of the pulp begins to involve in increasing measure the Embden-Meyerhof-Parnas pathway. [Author's abstract.]—Pl. physiol. Res. Inst., Univ. Pretoria.

## *Cacao.*

(*See also* 1013, 1914, 1960c, p.)

1877. ORELLANA, R. G.
**The Sixth Inter-American Cacao Conference, Salvador-Bahia, Brazil, May 20-27, 1956.**
*Cacao*, 1956, **3**(11): 2-23.
This conference, which was attended by 148 delegates and 147 observers representing most of the cacao producing countries of the world, was held at the Instituto do Cacau da Bahia. Sixty technical papers were presented, and, pending their publication in book form by the Institute, full and clear abstracts of them are given in this number of *Cacao*. Recommendations made by the Conference are also given; they covered a wide field ranging from the selection of new clones, through various cultural practices, to curing procedures and extension methods.

1878. KNIGHT, R.
**Induced polyploidy in *Theobroma cacao* L. and related species.**
*J. hort. Sci.*, 1957, **32**: 1-8, bibl. 8, illus.
A colchicine method is described for inducing polyploidy in *Theobroma cacao* and related species. A concentration of 0·6% in agar was found to be optimal in treating apical buds. Treatment was made when the cotyledons first opened to reveal the young shoot and axillary buds. Translocation of the colchicine was shown to occur in several instances. The tetraploid condition in cacao results in larger stomata, lower stomatal frequency per unit area, changes in leaf shape, leaf thickness, leaf colour and vein size. Attempts to distinguish periclinal chimeras on a basis of stomatal frequency alone was not successful. Polyploid sectors of the main axis, found in some cases up to six months after treatment, are not evident in the stem developing subsequently. These sectors are replaced by completely diploid or completely tetraploid layers. Periclinal chimeras, but not sectorial or mericlinal chimeras, are able to persist in the seedlings. Induction of polyploidy in related *Theobroma* species was less successful. [From author's summary.]—W. Afr. Cocoa Res. Inst., Tafo.

1879. TOPPER, B. F.
**New method of vegetative propagation for cocoa.**
*World Crops*, 1957, **9**: 38-9, bibl. 3, illus.
The new method, which consists of shield budding and subsequently inducing scion rooting, has been devised to replace propagation by cuttings. An inverted T cut is used and the bud should be completely covered with plastic tape. The take obtained in Jamaica in 1956 was 80%. If self-rooted plants are desired, the scion may be encouraged to root by nicking or partial ringing, treating with a root-inducing substance and earthing up. The advantages of propagation by this method compared with rooting cuttings are: (1) much lower cost of production; (2) all varieties of cacao may be budded with equal success; (3) economy of propagating material; (4) prunings may be used as budwood; and (5) budwood may be kept, if properly stored, for 4 days before use.—Dep. Agric., Jamaica.

1880. THROWER, L. B.
**The root diseases of cacao in Papua and New Guinea.**
*Papua New Guinea agric. Gaz.*, 1955 (issued 1956), **10**: 1-14, bibl. 3, illus.
Four important root diseases have been recorded on cacao in Papua and New Guinea, namely, white root disease (*Fomes lignosus*), brown root disease (*F. noxius*), wet root disease (*Ganoderma pseudoferreum*) and collar rot or dry root disease (*Ustulina deusta*). A general account is given of their mode of distribution and action, and keys are provided for their identification and for distinguishing them from several related saprophytes. Control measures are discussed.

1881. FORSYTH, W. G. C.
**Cacao polyphenolic substances. 3. Separation and estimation on paper chromatograms.**
*Biochem. J.*, 1955, **60**: 108-11, bibl. 12.
The application of two-way and quantitative paper chromatography to the polyphenols of the cacao bean

is illustrated. The bean contains four catechins (of which 92% is (—)-*epi*catechin), as well as at least three leucocyanidin compounds and two cyanidin glycosides. Some 3·0% of catechins and 2·5% of leucocyanidins are present in the freshly dried bean. [From author's summary.]—Colon. microbiol. Res. Inst., Trinidad. [For parts 1 and 2 see *H.A.*, 23: 1257 and 1258.]

1882. Forsyth, W. G. C., and Quesnel, V. C.
**Cacao polyphenolic substances. 4. The anthocyanin pigments.**
*Biochem. J.*, 1957, **65**: 177-9, bibl. 15.

The anthocyanin pigments of the cacao bean are 3-β-D-galactosidyl and 3-α-L-arabinosidyl cyanidin salts. [Authors' summary.]—Colon. microbiol. Res. Inst., Trinidad.

### *Coconuts.*

(*See also* 1352, 1959f, k, n, w, x, z, 1960e, h, s.)

1883. Liyanage, D. V.
**Hedge planting for coconuts?**
*Ceylon Coconut Quart.*, 1955, **6**: 24-8, bibl. 2.

It is estimated that about 30% of the seedlings raised from open-pollinated palms are uneconomic. The use of a hedge-planting system, with normal spacing between the rows but about 30% more seedlings planted in the rows, would make stringent selection possible while obtaining higher yields.

1884. Nathanael, W. R. N.
**Toddy yields from coconut palms in Ceylon.**
*Ceylon Coconut Quart.*, 1955, **6**: 8-16, bibl. 6.

Tapping studies were initiated with both tall and dwarf palms. In tall palms the juice started to flow about 12 to 15 days after tapping was begun, while with dwarf palms the interval averaged 10–13 days. Wide diurnal and seasonal variations were observed with both types of palm. The flow of juice from dwarf palms was markedly reduced after the fourth month, by which time the health of the trees had seriously deteriorated. Sap yields from tall palms increased until after the sixth month when a slight decline in daily yield was observed. The data indicated that yield and flow of sap were associated with environmental factors. It is suggested that selection of palms for tapping would enable higher and more uniform yields to be obtained.

1885. Phillips, J. S.
**Immature nutfall of coconuts in the British Solomon Islands Protectorate.**
*Bull. ent. Res.*, 1956, **47**: 575-95, bibl. 12, illus.

A re-examination of plantations, in which nutfall, caused by *Amblypelta cocophaga*, had declined during the war, has not lent support to the theory that this was due to ecological changes, which favoured beneficial ants at the expense of harmful ants [*H.A.*, 20: 401 and 2008 and 22: 3057]. Instead, the evidence suggested that the reduction in nutfall had been caused primarily by intensive aerial spraying to protect neighbouring military installations from malaria. This probability was confirmed in small-scale spraying tests using DDT and chlordane applied to the bases of the palms. The sprays affected the harmful ants, *Pheidole megacephala* and *Iridomyrmex myrmecodiae*, severely, while the beneficial species, *Oecophylla smaragdina* and *Anoplolepis longipes*, suffered far less. Both insecticides have also proved lethal to *Amblypelta*.

1886. Castel-branco, A. J. F.
A cochonilha dos coqueiros na ilha do Príncipe (*Aspidiotus destructor* Sign.). **(Coconut scale on Príncipe Island.)** [French summary ¼ p.]
*García de Orta*, 1956, **4**: 225-38, bibl. 1, illus.

Preliminary results suggest that a serious infestation of *Aspidiotus destructor* on coconuts on Principe Island is being successfully controlled by the parasite *Cryptognatha nodiceps* introduced from Trinidad.

### *Coffee.*

(*See also* 1959a, m, r, s, u, w, y, 1960c, g, k, m, o, q, v, 1961a, d, e, j, k, 1968.)

1887. Moss, R. I.
**A guide to coffee culture in Jamaica.**
[*Publ.*] *Jamaica Dep. Agric.*, 1956, pp. 55, illus.

Information and recommendations are provided on a wide range of topics, including propagation, rainfall requirements, aspect, spacing, shade, time and methods of planting, pruning and training, pests and diseases, soils and nutrition, and hoeing and slashing weeds.

1888. Indian Coffee Board.
***Eighth Annual Report of the Research Department of the Coffee Board 1954-55,***
Balehonnur, pp. 54, being *Bull.* 8.

Skeleton notes are given in this report of very numerous trials, most of them only recently established, on the different problems confronting the South Indian Coffee grower. They concern among others the following: *Agronomy:* The effect of different cultural practices including soil cultivation on the yield of arabica; manurial experiments on robusta; pruning robusta; topping robusta; blossom/berry correlations in robusta; treatment influencing the germination of arabica seed. *Botany:* Breeding and comparison of selections and crosses in arabica; leaf disease resistance; inter-specific crosses; trial of seed from different overseas countries; vegetative propagation, including topworking and frameworking robusta with leaf disease-resistant arabica scions, and the rooting of cuttings; a multiple *versus* single stem systems trial, started in 1952 and now beginning to yield results, which are discussed. *Chemistry:* Manurial experiments, N, P and K, with both arabica and robusta; foliar feeding with urea and various sprays; manuring in the nursery; removal of mucilage by acids and alkalis. *Entomology:* Studies on the white stem borer (*Xylotrechus quadripes*); green bug (*Coccus viridis*) on arabica; shot hole borer on robusta (*Xyleborus morstatti*); discussion of the possible use of parasites and predators of pests; eelworms. *Mycology:* Main work devoted to study of incidence and control of leaf disease caused by *Hemileia vastatrix*; black rot (*Pellicularia koleroga*); nursery diseases caused by *Cercospora coffeicola*, *Colletotrichum coffeanum* and *Rhizoctonia solani*.

1889. Coffee Research Station, Ruiru.
**Guide to the research laboratories and field experiments on Jacaranda Estate and to the Demonstration Farm, Rukera Estate. Planters' day, July 1956.**
[*Publ.*] *Dep. Agric., Kenya*, [1956], pp. 51, illus.

This concise guide for visitors, first published in 1951, has been brought up-to-date. Results of field experiments are briefly recorded.

1890. Jones, P. A.
**Notes on the varieties of *Coffea arabica* in Kenya.**
*Mon. Bull. Coffee Bd Kenya*, 1956, **21**: 305-9, bibl. 31.

Notes are provided on the origin, appearance and other characteristics of more than 25 varieties and many selections of *Coffea arabica* growing in Kenya.

J.R.L.

1891. Laíns e Silva, H.
Contribuição para o estudo das causas da variação anual de produção de café. **(Contribution to the study of causes of annual variation in coffee production.)** [English summary 1 p.]
*Rev. Café portug.*, 1956, **3**(10): 13-28, bibl. 8.

Detailed statistical studies at Campinas, S. Paulo, Brazil, showed a significant negative correlation between the yields of successive years. There was no clear correlation between yield and distribution of rainfall throughout the year.

1892. Bitancourt, A. A., and Pinheiro, E. D.
A sêca dos ponteiros do cafeeiro na presente estação. **(Die-back of coffee in the present season.)**
*Biológico*, 1956, **22**: 140-2.

There is no evidence of a pathogen, but the severity of the attack in São Paulo is attributed to prolonged vegetative growth and a consequent decrease of cold resistance, coupled with soil impoverishment resulting from an abnormally wet and cold winter.

1893. Suárez de Castro, F., and Rodríguez G., A.
Aplicación de la cal en cafetos jóvenes. **(Application of lime to young coffee plants.)**
*Rev. cafet. Colombia*, 1956, **12**: 4294-4301, bibl. 6.

In a sandy loam soil of pH 5·5 the growth of young coffee plants was satisfactory both with 1 metric ton of slaked lime per ha. and without lime. Heavier applications of lime reduced the dry weight of plants and soil content of soluble P, and although they markedly increased soil nitrate this was not reflected in the N content of the plants.

1894. Viégas, A. P.
Molestias do cafeeiro. **(Diseases of coffee.)**
*Bol. Super. Serv. Café, S. Paulo*, 1956, **31**(348): 17-18.

Brief instructions are given for controlling damping-off (*Rhizoctonia solani*), the physiological disturbance known as "fourth year disease", "grey eye" caused by *Cercospora coffeeicola*, anthracnose due to *Colletotrichum coffeanum*, and sooty mould associated with *Coccus viridis*. The root-knot nematode *Meloidogyne exigua*(?) is not a serious pest in Brazil; organic manures tend to exclude it. Fissuring of the stems is probably caused by frost or heat. Cutting out affected parts leads to complete recovery.

1895. Castaño A., J. J.
Podredumbre del cuello radicular de plántulas de café en el semillero, causada por un hongo del género *Rhizoctonia*. **(Root collar rot of seedlings in coffee seed beds caused by a fungus of the genus *Rhizoctonia*.)**
*Bol. inf. Café, Chinchiná-Caldas*, 1956, **7**: 192-7, bibl. 2, illus.

A severe attack of damping-off was controlled by alternate applications at 8-day intervals of Shell copper (50% cuprous oxide) at a concentration of 500 g./100 l. water and Orthocide 50 (5% captan) at half this concentration. A single application to the soil of Terrachlor (pentachloronitrobenzene) at 500 g./100 l. water gave complete control.

1896. LeBeau, F. J., Flores, M. A., and Hernández, M. R.
El cancer del café causado por *Nectria*. (***Nectria* canker of coffee.**)
*Bol. agríc. Minist. Agric., Guatemala*, **2**, 1955, pp. 10, illus.

Symptoms caused by *Nectria dodgei* are described. Infection appears to increase with altitude. Control can be effected by applying bordeaux mixture to the trunks at the beginning of winter and each month during the rainy season. Diseased tissue should be cut away in summer and the wounds treated with bordeaux mixture.

1897. Flores, M. A., LeBeau, F. J., and Straube, E.
El koleroga en al café. **(Koleroga in coffee.)**
*Bol. agríc. Minist. Agric., Guatemala*, **4**, 1955, pp. 14, bibl. 1, illus.

Symptoms caused by *Pellicularia* (*Corticium*) *koleroga* are described. Maximal light and air are necessary in the rainy season to check the disease. Instructions are given for fungicidal treatments with copper compounds.

1898. Saccas, A. M.
Les *Rosellinia* des caféiers en Oubangui-Chari. (***Rosellinia* spp. on coffee in Oubangui-Chari.)** [English and Spanish summaries ⅓ p. each.]
*Agron. trop.*, 1956, **11**: 551-95, illus., and 687-706, bibl. 228, illus.

Details of structure and biology are given for 10 *Rosellinia* species found associated with coffee as parasites or saprophytes. The importance of removing from the soil all woody residues containing starch reserves is emphasized as a control measure. Various fungicidal treatments of soils and infected roots are briefly reviewed.

1899. Anon.
Processam-se em Ribeirão Preto e Lins experiências em torno do ataque do bicho mineiro aos cafeeiros. **(Experiments are in progress in Ribeirão Preto and Lins on infestation of coffee by leaf miners.)**
*Fôlha da Manhã* 28th Oct., 1954, reprinted in *Bol. Super. Serv. Café, S. Paulo*, 1954, **29**(332): 56-60 [received 1957].

There is some evidence that drought, rather than leaf miners, causes leaf fall in São Paulo coffee plantations and that the application of insecticides is not justified economically. Experiments in progress should soon provide a definite answer.

1900. Teixeira, E. F.
O combate ao bicho-mineiro do cafeeiro. **(Control of the coffee leaf miner.)**
*Estado S. Paulo*, 22 Dec. 1955, reprinted in *Bol. Super. Serv. Café, S. Paulo*, 1956, **31**(347): 31-2.

Preliminary trials showed that the larvae [of *Perileucoptera coffeella*] could be killed inside the leaves by the application of parathion, Systox, endrin, malathion, dieldrin, chlordane, DDT, isodrin, lindane or Metacide.

### *Guavas.*

(*See also* 1961f.)

1901. Jain, S. S.
**A preliminary note on the inactivation of *Fusarium oxysporum f. psidii* in guava plants by chemotherapeutic treatment.**
*Indian J. Hort.*, 1956, **13**: 102-4, bibl. 5.

Injection of 0·1% of 8-quinolinol sulphate into healthy guava plants gave protection from wilt for at least a year. Similar injections helped slightly-wilted guava plants to recover.—Sect. Plant Path., Kanpur, Uttar Pradesh.

### *Mangoes.*

(*See also* 1959c, i, 1975.)

1902. Pimentel Gomes, F., and Simão, S.
Correlação entre brix e açúcar em manga. **(Correlation between brix and sugar in mango fruit.)** [English summary ¾ p.]
*Rev. Agric. Piracicaba*, 1956, **31**: 227-33, bibl. 4.

Tests and a statistical examination of results from 10 varieties showed that a different regression equation governed the brix/sugar relationship in each variety, but within varieties the brix values were adequate for estimating sweetness.

1903. Richardson, H. H., and Roth, H.
**Ethylene dibromide fumigation of mangoes infested with the West Indian fruit fly at temperatures near 55° F.**
*J. econ. Ent.*, 1956, **49**: 715-17, bibl. 6, illus.

Small-scale tests at Hoboken, N.J., in 1954 and 1955 indicated that ethylene dibromide fumigation was highly effective against the West Indian fruit fly, *Anastrepha mombinpraeoptans* Sein, in mangoes at temperatures near 55° F. (air and fruit pulp). A dosage of 2 oz. per 1,000 cu. ft. for a 2-hour exposure was effective in small fumigation chambers with approximately a 25% fruit load. Mango tolerance also appeared good at this and higher dosages. In practical scale tests made in 1956, effective dosages varied from 4 oz. per 1,000 cu. ft. in a 50 cu. ft. chamber with a 25% fruit load up to near 12 oz. per 1,000 cu. ft. in a 2,600 cu. ft. chamber with a 40 to 45% load of mangoes, packed in commercial crates. [Authors' summary.]—Ent. Res. Br., agric. Res. Serv., U.S.D.A.

### *Oil palms.*

(*See also* 1959d.)

1904. Wormer, T. M., and Ochs, R.
Humidité du sol et comportement du palmier à huile en pépinière. **(Soil moisture and the behaviour of oil palms in the nursery.)**
*Oléagineux*, 1957, **12**: 81-9, bibl. 3.

Oil-palm seedlings were grown, with and without watering, under clean cultivation, straw mulch and a mulch consisting of bunch stalks. Seedling growth was more rapid and moisture more plentiful in the top 15 cm. of soil under unwatered mulch, particularly straw, than in regularly watered bare soil. The moisture content in this soil layer was significantly correlated with seedling growth, stomatal aperture and foliar N and P.

1905. May, E. B.
**The manuring of oil palms—a review.**
*J. W. Afr. Inst. Oil Palm Res.*, 1956, **2**(5): 6-46, bibl. 37.

A review has been made of all available published work on the manuring of the oil palm in Malaya and the Belgian Congo, and in West Africa, other than that carried out by the West African Institute for Oil Palm Research and the Nigerian Department of Agriculture, which is dealt with in a separate article [see next abstract]. [From author's summary.]

1906. May, E. B.
**Early manuring experiments on oil palms in Nigeria.**
*J. W. Afr. Inst. Oil Palm Res.*, 1956, **2**(5): 47-73, bibl. 13.

The results of 11 factorial oil palm manuring experiments started between 1940 and 1950 in various parts of Nigeria are summarized. It was found that in 3 cases there were significant responses to K, comparatively small dressings producing marked responses in yield one year after application. Improvement in the water holding capacity of the soil is thought to have been responsible for the increased yields which resulted from the addition of organic manures in 2 trials. No response was obtained to applications of N or P.
J.R.L.

1907. Chapas, L. C., and Bull, R. A.
**Effects of soil applications of nitrogen, phosphorus, potassium and calcium on yields and deficiency symptoms in mature oil palms at Umudike.**
*J. W. Afr. Inst. Oil Palm Res.*, 1956, **2**(5): 74-84, bibl. 11.

The effects obtained in a $3^4$ confounded factorial manurial experiment where single applications of ammonium sulphate, superphosphate, potassium chloride and lime were made in 1948 to an area of mature oil palms are described. On the plots which received K large increases occurred in the number of bunches produced, the average weight of the bunches and the number of bearing palms, and this beneficial effect still persisted after 7 years. A description is given of the mineral deficiency symptoms which occurred, namely, orange spotting, two types of chlorosis and a premature withering of the older fronds. In a disease survey in

1956 K had, in all cases, improved the appearance of the palms. Economic aspects of fertilizer applications are also considered. J.R.L.

1908. Bull, R. A., and Chapas, L. C.
**Some effects of soil applications of magnesium sulphate on the visual symptoms and yields of magnesium deficient oil palms at Calabar.**
*J. W. Afr. Inst. Oil Palm Res.*, 1956, **2**(5): 85-91, bibl. 1.

Soil applications of 5, 7½ or 10 lb. magnesium sulphate per palm cured the symptoms of Mg deficiency within 9 months. The extent of the recovery depended upon the amount of Mg applied. In the case of the lower rates used additional applications were made later so that all palms ultimately received 10 lb. $MgSO_4$. The yield and average bunch weight were significantly increased by initial applications of 5 or 7½ lb. $MgSO_4$ and the number of bearing palms by 10 lb. dressings. J.R.L.

1909. Ferrand, M., and Bachy, A.
La carence magnésienne du palmier à huile au Moyen Congo. (**Magnesium deficiency of oil palms in the Middle Congo.**)
*Oléagineux*, 1957, **12**: 15-19, bibl. 8.

Further studies carried out on trees affected by "Boyomi" disease [see *H.A.*, 22: 1935] established Mg deficiency as the cause. Symptoms were yellowing and drying of the lower and middle leaflets and vascular necrosis of the rachis. Healthy and affected leaves were compared for their contents of N, P, K, Ca and Mg. There was very high correlation between leaf Mg, tree health and yield. Significant yield responses to Cu, Mg and Mn were again recorded for the 4th, 5th and 6th experimental years. The action of Cu tended to decrease, that of Mn showed little change and that of Mg increased. In an experiment comparing the effects of various elements in preventing "Boyomi" the percentage of affected trees was lowest in the presence, and highest in the absence, of Mg. A similar, but less marked effect was shown by Mn, while N and K each appeared to favour the disease. Severely affected trees were cured in one year by applying 5 kg. magnesium sulphate per tree to the soil, which was free-draining and acid, but doses provisionally recommended are 1 kg. per tree in the first and 0·5 kg. in subsequent years.

1910. Kovachich, W. G.
**Patch yellow disease of the oil palm.**
*Trans. Brit. mycol. Soc.*, 1956, **39**: 427-30, bibl. 4, illus.

Inoculation experiments have shown that patch yellow disease of the oil palm is caused by *Fusarium oxysporum*. Infection occurs in the young closed "spear" leaves and spreads inwards to the central vein of the leaflet, and thence to the other half of the leaflet and to other leaflets forming yellow patches. Bad attacks may affect the growth of the roots and stems. Experiments showed that nursery palms under 1 year old were not susceptible to the disease, but 50% were susceptible at 18 months, 22·5% at 3 years and 7·5% at 6 years. In plantations it is unusual to find more than 1·5% affected. It is considered that the intensity of the disease depends on the susceptibility of the host and not on physiological races of the pathogen.—Huilever S.A., Yaligimba lez Bumba, Belgian Congo. J.R.L.

### *Papaws.*

1911. Head, W. F., Jr., and Lauter, W. M.
**Phytochemical examination of the leaves of *Carica papaya* L.**
*Econ. Bot.*, 1956, **10**: 258-60, bibl. 11.

Papaw leaves grown in Florida were found to contain small amounts of flavonols, tannins, organic acids and alkaloids. Carpaine has been isolated and identified. Results of a routine crude drug analysis are reported. [From authors' summary.]—Univ. Fla.

### *Pineapples.*

(*See also* 1391, 1421, 1924, 1959e, 1960u.)

1912. Shing, K.-C., and others.
**An experiment on regulating the fruiting season of the pineapple by alpha-naphthalene-acetic acid.** [Chinese, with English summary 1 p.]
*Mem. Coll. Agric. Nat. Taiwan Univ.*, 1956, **4**(2): 37-51, bibl. 15.

Slips of Smooth Cayenne pineapple planted in Sept., 1952, were sprayed on Sept. 1, Oct. 11, or Nov. 23, 1953, with 5 or 10 c.c. NAA at 20, 30, 40, 50 or 60 p.p.m. in 4 different solvents, namely, ethyl alcohol, mono-ethanolamine, lanolin-stearic acid or neutralized with sodium hydroxide. The type of solvent had less effect on flowering than the concentration and amount of NAA applied per plant or than the season of application. The highest average percentage of flowering for solutions applied on Sept. 1 was 72·98% on plots receiving 5 c.c. of 20 p.p.m. NAA, and for solutions applied on Oct. 11 was 93·62% on plots receiving 30 p.p.m. NAA applied on Nov. 23, about 40 days before normal flower bud differentiation, did not affect flowering. Flowers became visible between 40 and 70 days after NAA was applied. The weight of the fruit was dependent upon the size of the treated plant. Fruit produced as a result of the NAA treatments had a higher acid content than fruit from untreated plants. The NAA treatments Sept. 1 and Oct. 11 advanced the harvesting season by 4 and 2 months respectively, and as the fruits on these plants also ripened more uniformly fewer pickings were needed. The NAA treatments, which were effective in inducing flowering, inhibited slip growth. They did not affect the production of suckers, and, in fact, the suckers on treated plots made better growth than those on untreated plots. J.R.L.

1913. Rehm, S.
**Zinc deficiency in pineapples.**
*Fmg S. Afr.*, 1956, **32**(8): 20-1, illus.

Pineapples in Swaziland which suddenly became chlorotic were restored to a healthy green by foliar sprays of 0·1% zinc sulphate. Leaf curling was not observed.—Hort. Res. Stat., Pretoria.

1914. Fernando, H. E.
**Pineapple and cacao mealy-bugs of economic importance in Ceylon.**
*Trop. Agriculturist*, 1956, **112**: 132-41, bibl. 14, illus.

Trials on the control of pineapple mealybug (*Pseudococcus brevipes*) are reported. Mealybugs on suckers intended for planting were completely controlled by dipping in 0·05% malathion, 0·025% diazinon or 0·01% parathion emulsions [see also *H.A.*, 26: 1170]. The suckers were stacked in an upright position after dipping to allow the insecticides to drain into the space between the leaf bases. Ekatin and Metasystox showed no systemic action, although laboratory tests had shown them to be effective contact sprays against the pest. Aldrin, dieldrin and chlordane sprays around the base of the plants were effective in controlling ant populations associated with the mealybugs. Growers using a coconut fibre dust as a mulch are advised to keep the bases of the plants free to prevent the increase of mealybug populations. Of three species of mealybug, *Pseudococcus lilacinus*, *P. citri* and *Ferrisia virgata*, infesting cacao, the first two are known to transmit virus, but in experiments with over 200 seedlings no positive transmission was obtained with *F. virgata*. Experiments have also shown that the cacao virus is not transmissible to seedlings of the shade tree dadap (*Erythrina lithosperma*), and it is concluded that the vein flecking symptoms seen on dadap leaves are probably not related to the cacao virus.—Dep. Agric. Ceylon. J.R.L.

1915. Carter, W., and Ito, K.
**Study of the value of pineapple plants as sources of the mealybug wilt factor.**
*Phytopathology*, 1956, **46**: 601-5, bibl. 7.

The value of pineapple plants as sources of the mealybug wilt factor was tested over a period of 2 growth cycles, using 6 different clones distributed in 6 different localities. Most of the positive sources occurred in the resistant clones, and in only a few instances were positive sources found in susceptible clones. The data indicated that the mealybug wilt factor is a fluctuating latent factor limited to certain plants and modified only slightly by local environmental and agronomic conditions.—Pineapple Res. Inst. Hawaii, Honolulu.

1916. Anderson, E. J.
**Comparison of initial kills and subsequent increase of nematode populations following fumigation.**
From abstr. in *Phytopathology*, 1956, **46**: 634.

Three nematocides were used in soil fumigations against *Rotylenchus reniformis*. The best initial kills of nematodes were obtained with DD at 40 gal. per acre applied as row treatment under a paper cover. Pineapples were grown on the plots after fumigation, and 8 months after treatment the parasitic nematode populations were sampled. It was shown that the increase of populations had been greatest in plots treated with ethylene dibromide and least in those treated with 1,2-dibromo-3-chloropropane.

### *Rubber trees.*

(*See also* 19591, o, 1961b, c, h.)

1917. Muzik, T. J.
**Studies on the development of the embryo and seed of *Hevea brasiliensis* in culture.**
*Lloydia*, 1956, **19**: 86-91, bibl. 10, illus.

Embryos of *Hevea brasiliensis* were placed in nutrient agar culture in all stages of development. Only the mature or nearly mature embryos continued to develop. These embryos usually followed the normal pattern of germination and early growth. Unless one-third or more of the cotyledons was attached to the embryo axis, it failed to grow. Immature ovules did not develop in culture. In mature ovules, the perisperm turned green but did not regenerate roots or buds. Mature cotyledons rooted readily when separated from the embryo; in two cases they also regenerated a new shoot. Abnormal growth of the complementary tissue of the lenticel occurred on young plants in culture. [Author's summary.]—Fed. Exp. Stat., Mayagüez, P.R.

1918. de Silva, C. A.
**Budwood nurseries.**
*Quart. Circ. Rubb. Res. Inst. Ceylon*, 1956, **32**: 4-12, illus.

Practical notes are given on location and layout, planting and planting material, care of bud grafts, manuring, "types" of budwood and buds for grafting, number of buds per yard, and cutting, labelling, packing and storing budwood.

1919. Thirion, F., Carnewal, J., and Denis, J.
Essais de saignée en hévéaculture dans les plantations expérimentales de l'INÉAC.
**(Tapping trials in hevea cultivation in the I.N.É.A.C. experimental plantations.)**
*Bull. Inf. I.N.É.A.C.*, 1956, **5**: 281-315.

Yields were recorded from two localities, A and B, in which tapping treatments compared were: (A) S/2. 3w/6 (3 weeks out of every 6); S/2.d/2; S/3.d/2; S/2.d/3; annual pauses 0, 1 or 2 months; duration 5 years. (B) S/2.d/2; S/3.d/2; S/2.d/3; annual pauses 0, 1, 2 or 3 months; duration 6 years. At A the system S/2.3w/6 was slightly more productive than the others, which for was both localities ranged in descending order as shown above. The longer the annual pause at either A or B, the lower was the yield from any tapping system. All 6 clones involved showed parallel responses. The economic aspect is discussed. Brown bast disease increased with intensity of tapping.

1920. Rubber Research Institute of Malaya.
**Secondary leaf fall.**
*Plant. Bull. R.R.I.M.*, 1956, No. 27, pp. 105-9, illus.

Secondary leaf fall occurs during the period of refoliation after the annual leaf fall or wintering, and may be caused by one of four organisms, the fungi *Oidium heveae* and *Gloeosporium alborubrum*, the mite *Hemitarsonemus latus* and the thrips *Scirtothrips dorsalis*. In Malaya none is considered serious enough to require control measures. J.R.L.

1921. Rubber Research Institute of Malaya.
**Decaying timber spreads root disease.**
*Plant. Bull. R.R.I.M.*, 1957, No. 29, pp. 31-5, illus.

The three major root disease fungi of rubber, *Fomes lignosus*, *F. noxius* and *Ganoderma pseudoferreum*, are able to exist as saprophytes in moribund or dead wood. Budded seedlings have been infected from stakes, which became diseased, although they were cut from healthy jungle or rubber trees. In one experiment the cover of

weeds around the collars of trees in a plantation greatly increased the incidence of *F. lignosus*.

J.R.L.

1922. Rubber Research Institute of Malaya.
**Scale insects and mealy bugs.**
*Plant. Bull. R.R.I.M.*, 1957, No. 28, pp. 15-19, illus.

The scale insects *Saissetia nigra*, *Pulvinaria maxima* and *Lepidosaphes cocculi* and the mealy bug *Ferrisia virgata* are described. All are normally controlled by predators and parasites, but an oil emulsion spray (1 part oil in 40 parts water) applied at weekly intervals is recommended for attacks on rubber which gets out of hand. This spray will not harm the beneficial insects.

J.R.L.

1923. Anderson, D. M. W., Greenwood, C. T., and Robertson, J. S. M.
**Carbohydrates of the seeds of the rubber tree, *Hevea brasiliensis*.**
*J. chem. Soc. Lond.*, 1957, pp. 401-5, bibl. 13.

The carbohydrate materials present in the endosperm, cotyledons, and shell of the seeds of the rubber tree have been examined by means of a graded extraction procedure, and the results of chromatographic and other analyses of the fractions so obtained are reported. The endosperm, cotyledons, and shells all contain a mixture of polysaccharides which gave on hydrolysis galactose, glucose, arabinose, xylose, rhamnose, and uronic acid units. The cold-water extract of the endosperm has been studied in detail and an araban-rich fraction isolated. [From authors' abstract.]—Dep. Chem., Univ. Edinburgh.

## *Sugar cane.*

(*See also* 1352, 1392, 1959g, h, q, v, w, 1960d, i, l, w, y, 1974.)

1924. Hawaiian Sugar Planters' Association.
***Report of the Experiment Station Committee for the year ending September 30, 1956,*** pp. 74, illus.

Brief reports are given of many projects: *Cultural practices:* Fertilization (aqua ammonia injections, aerial application, N, P, and K effects), irrigation, soil tillage, growth stimulation by gibberellic acid, and aerial control of rats. *Diseases:* Downy mildew resistance trials of Hawaiian varieties in Fiji, hot PMA treatments of setts, soil fumigation and a nematode survey. *Insects:* Studies on mealybugs and light traps. *Mechanization:* Cut-and-load harvesting and transport, selfloading transport for cut cane, a cross-flow cutting unit, a modification of cutter transport, side mounted cutter-windrower, and a metal flume pick-up machine. *Organic chemistry:* Biochemical studies of cuticle wax. *Varieties:* Breeding, testing, the variety position in 1956, flowering control. *Water development. Weather:* Moisture consumption studies on pineapples, and the effect of temperature on carbohydrate movement within the plant. *Weed control:* Field screening studies with new herbicides, effects of herbicides on crop plants, and improvements in spray equipment. *Yield decline:* Responses (only clear in one case) of declining and non-declining varieties to applications of compost and soil fumigation.

1925. Queensland.
***Fifty-sixth Annual Report of the Bureau of Sugar Experiment Stations 1955/56,*** Brisbane, 1956, pp. 102, illus.

Among the subjects reported are fertilizer trials, the effect on cane quality of 2,4-D and cyclone damage, irrigation, variety trials and the breeding of new seedlings, studies on ratoon stunting (including its control and effect on yields), and chemical treatment to improve the germination of hot-water-treated plants.

1926. South African Sugar Association.
***Annual Report of the Experiment Station of the South African Sugar Association, Mount Edgecombe, Natal, for 1955-56,*** pp. 38, illus.

The annual report is this year issued separately from the *Sugar Yearbook* and includes information on: *Plant nutrition:* fertilizer trials, minor element deficiencies, sucrose accumulation. *Cultural practices:* trash and fallow management, irrigation, plant spacing. *Cane varieties:* photoperiodic induction of flowering, seed storage, raising and selecting seedlings. *Cane diseases and weed control:* mosaic resistance trials, the effect of ratoon stunting disease on yield, fungicidal trials, glasshouse and field trials of pre-emergence herbicides (the combination of cultivation with herbicide application was better than herbicides alone). *Entomology:* germination of setts was inhibited by inoculation with an extract of the mealybug *Saccharicoccus sacchari*; repeated defoliation of first-ratoon canes, to simulate that caused by armyworms or trashworms, caused some reductions in the number and size of second ratoon shoots; the effect of artificially-induced dead-heart similar to the effect of *Sesamia calamistis* is also being studied.

1927. Divekar, M. V.
**The root study of some promising sugarcane varieties.**
*Poona agric. Coll. Mag.*, 1956, **47**: 106-9, bibl. 6.

Of four sugar cane varieties selected for this study Co.419 produced the highest dry weight of roots per cane and its root system spread farthest in the upper layers of the soil. No relationship was found to exist between the weights of roots and cane.

1928. Samuels, G., Landrau, P., Jr., and Capó, B. G.
**Influence of fertility levels on the varietal response of sugarcane.**
*J. Agric. Univ. P.R.*, 1956, **40**: 129-43, bibl. 7.

In 8 experiments the yields of 11 sugar cane varieties grown on 6 soil series at low or medium N or K or high NPK was recorded. The varieties varied in their response to fertilizer applications. It is suggested that some cane varieties developed in one geographic area do better there than elsewhere, whereas others grow well in many districts. Some varieties yield best at high fertility levels, whereas others yield better with relatively low levels of nutrients. J.R.L.

1929. Locsin, C. L., and Tabayoyong, F. T.
**A review of variety × fertilizer factorial tests during the 1954-55 and 1955-56 crop years in the Victorias milling district.**
*Sugar News*, 1956, **32**: 473-88, bibl. 11.

Of 13 commercial cane varieties planted in 10 variety × fertilizer trials 7 yielded better than the standard H.37-1933. Six varieties were tested in each trial and there were 4 NPK treatments, namely 80 : 80 : 120, 120 : 120 : 240, 180 : 180 : 360 and 180 : 120 : 180 kg./ha. C.P. 29/116 yielded 22% more sugar than H.37-1933, the most profitable returns being obtained from planting during July–October and fertilizing at the 80 : 80 : 120 rate. H.44-3098 yielded 17% more sugar than the standard and did best when fertilized at the 120 : 120 : 240 rate. H.46-3289 given the 180 : 120 : 180 fertilizer produced 11% more sugar than H.37-1933 under the same conditions. Q.50 and P.O.J.2967 were only used in one trial but yielded 13% and 9% more sugar than the standard. J.R.L.

1930. Tabayoyong, F. T.
**Variety × fertilizer test (6 × 4 factorial).**
*Sugar News*, 1956, **32**: 537-43.

A trial, in which 6 cane varieties received 4 NPK fertilizer treatments, was planted in July. N : Co.310 fertilized at the rate of 80 : 0 : 60 kg./ha. gave the most profitable return, although C.P.29/116 fertilized at the rate of 120 : 100 : 180 produced appreciably more cane and sugar. J.R.L.

1931. Tabayoyong, F. T.
**Variety × fertilizer tests (6 × 4 factorial).**
*Sugar News*, 1956, **32**: 600-3.

A trial, using 6 cane varieties and comparing 4 rates of NPK fertilizer, was planted in May. H.44-3098 fertilized at the rate of 180 : 120 : 180 kg./ha. gave the highest yield of sugar, but this was not significantly different from the yields of P.O.J.2967 and H.39-3633, each given a 120 : 120 : 240 fertilizer. J.R.L.

1932. R., G.
Concimazione con urea della canna da zucchero. (**Fertilizing sugar cane with urea.**)
*Riv. Agric. subtrop.*, 1956, **50**: 561-2.

The results are summarized of an experiment in Somaliland, in which sugar cane responded to urea application by increased yield, improved quality and earlier maturation.

1933. du Toit, J. L.
**Copper deficiency discovered in the Sugar Belt.**
*S. Afr. Sugar J.*, 1956, **40**: 797-9, bibl. 4.

Symptoms occurring on Co.331 which resembled copper deficiency were corrected by copper sulphate applied as a top-dressing or spray.

1934. Wang, C.-C.
**Ratooning potentiality and ratoon stunting disease of sugar cane.** [Chinese, with English summary 1 p.]
*Mem. Coll. Agric. Nat. Taiwan Univ.*, 1956, **4**(2): 15-36, bibl. 7, illus.

Varieties of the wild species *Saccharum robustum* and *S. spontaneum* produced more ratoon canes than did cultivated varieties of *S. sinense*, *S. barberi* and *S. officinarum*. The length, thickness and weight of stalks was reduced only slightly in the first ratoon crop compared with the plant crop, but there was a much greater reduction in the second ratoon crop. N : Co.310, Co.X, G.107, Co.290, CP.36-13 and F.134 produced many heavy canes in ratoon crops. After 2 years ratoon stunting was observed in most varieties. The Co. varieties were more seriously affected than the P.O.J. varieties, while the F. varieties showed little deterioration. No symptoms of the disease were observed in the second ratoon crops of F.105, F.110, F.115 and P.O.J.2967. The reduction of stalk length in the ratoon crops is considered to be due to physiological factors rather than to ratoon stunting disease. J.R.L.

1935. Steindl, D. R. L.
**Ratoon stunting disease yield trials.**
*Cane Grs' quart. Bull.*, 1956, **20**: 57-60.

Results obtained so far from Queensland trials are summarized. Among important commercial varieties, which have shown serious losses in yield, are Trojan, Pindar, Q.47, N.Co.310, P.O.J.2878, and Vidar. Those least affected by the disease include Badila, C.P.29/116, Comus and Q.50. The disease appears to have little or no effect on c.c.s. values.

1936. Fors, A. L.
El raquitismo del retoño: una enfermedad difícil de la caña de azucar. (**Ratoon stunting: a troublesome disease of sugar cane.**)
*Mem. XXIX Conf. an. Asoc. Téc. azuc. Cuba, 1955*, pp. 41-4.

Symptoms, transmission by implements, hot water treatment and yield reduction are discussed. Affected plants benefited slightly from irrigation, but not demonstrably from the application of complete fertilizer.

1937. Adsuar, J.
**Preliminary note on the so-called recovery of the cane variety B.34104 from the sugar-cane mosaic virus in Puerto Rico.**
*J. Agric. Univ. P.R.*, 1956, **40**: 206-7, bibl. 3.

Single 3-eyed setts from healthy stools of the varieties B.34104 and B.37161 were planted in pots and when 10 in. high were inoculated with juice extracted from canes infected with mosaic. When symptoms appeared in the inoculated canes they were planted in the field. After 6 months 5 plants of B.34104 and 3 of B.37161 had apparently recovered; they appeared healthy and extracted juice did not cause virus symptoms to develop in sorghum seedlings. However, setts from the canes which had recovered showed symptoms of mosaic when they in turn were inoculated with infected juice. J.R.L.

1938. King, N. C.
**Gumming disease in Natal.**
*Bull. S. Afr. Sugar Ass. Exp. Stat.* **1**, 1956, pp. 4, bibl. 1, illus., issued as supplement in *S. Afr. Sugar J.*, 1956, Vol. **40**, No. 12.

The presence of gumming disease, caused by *Xanthomonas vasculorum*, has been recently confirmed in the Natal Sugar Belt. This bulletin describes the symptoms of the disease with the aid of coloured photographs, and suggests control measures designed to restrict the spread of the pathogen. So far as is known at present N : Co.310 is the only important variety grown in Natal, which does not show adequate resistance for practical purposes.

1939. Wilson, G.
**Control of the cane grub pests, *Dermolepida albohirtum* Waterh. and *Lepidiota frenchi* Blkb. by benzene hexachloride.**
*Tech. Commun. Qd Bur. Sugar Exp. Stats* **2**, 1956, pp. 41, bibl. 10, illus.

In experiments on the control of greyback beetle grubs (*Dermolepida albohirtum*) there was no significant difference between the action of crude BHC containing 13% and a refined product containing 60% of the gamma isomer at rates supplying equal amounts of active substance per acre. Dusts containing 1·3%, 2·6% and 6·5% γ-isomer were equally effective when used on a comparable basis. Both greyback and frenchi grubs were more effectively controlled by placing BHC above rather than below the setts, where it also reduced germination. Yields were reduced, but grub control was not impaired, by mixing BHC with fertilizer. Comparable yields were obtained whether the BHC was all applied to the plant crop or divided between it and the first ratoon crop. Neither yield nor quality of cane was reduced by crude or refined BHC during the first 3 years of a projected long-term soil toxicity trial. There was no evidence of an increase in the sugar content of early cut cane by uncontrolled light infestation. Applying 75 lb. per acre of 20% BHC (2·6% γ-isomer) above the setts at planting controlled 3rd-stage frenchi grubs, but only poor control was achieved with 200–400 lb. in the half-open drill. Greybacks were controlled and 1st-stage frenchi grubs eliminated from the plant cane and first ratoon crops by 150–200 lb. per acre of the same dust.

1940. Usman, S., and Sastry, K. S. S.
**Occurrence of the sugarcane whitefly *Neomaskellia bergii* Signoret, in the Visvesvaraya Canal Tract.**
*Mysore agric. J.*, 1956, **31**: 179-81, bibl. 4.

The life-history of the sugar cane whitefly is described. A high degree of parasitism was observed, and predacious species have also been found. The removal of leaves attacked by the pest will help in its control. In serious attacks a spray of Folidol E 605 has been effective.—Dep. Agric., Bangalore.

1941. Lizárraga Goñi, J.
Cana quemada. **(Burnt sugar cane.)**
*Mem. XXIX Conf. an. Asoc. Téc. azuc. Cuba, 1955*, pp. 53-9.

Results are quoted from a series of field experiments showing decreases in sugar content and in purity in different cane varieties after burning, which is strongly deprecated.

1942. Fors, A. L.
Concepto erróneo sobre el corte de la caña de azúcar. **(An erroneous idea concerning the cutting of sugar cane.)**
*Mem. XXIX Conf. an. Asoc. Téc. azuc. Cuba, 1955*, pp. 37-40.

Experiments comparing high and low cutting showed that the former was uneconomic in spite of the increase in the number of ratoon stalks per plant. It also encouraged shallow rooting.

1943. Anon.
**Simple self-loading trailer and articulated crane.**
*S. Afr. Sugar J.*, 1956, **40**: 867-71, illus.

The new Bell trailer, which costs about £350 complete with a winch, is two-wheeled with the back portion sloping backwards to form a ramp. For loading it is backed against a 2–3-ton stack of cane formed in the field on bamboo poles. A wire rope passed under the stack and returned over its top is attached to the winch, which hauls the load on to the trailer. The trailer is off-loaded on to golovans by means of an articulated crane. The cost of haulage based on moving 60 tons 1 mile to the crane in an 8–10-hour day is estimated at 3·88s. per ton. Both trailer and crane are manufactured at Durban.

## *Tea.*

(*See also* 1960a, b, f.)

1944. Tolhurst, J. A. H.
**Ideas on the experimental replanting of tea.**
*Tea Quart.*, 1956, **27**: 60-6.

After a discussion on the numerous factors likely to affect the success of replanting tea the author recommends a system and gives reasons for it. The operation is in 3 stages as follows: *Soil rehabilitation.* 1. After uprooting and contour lining plant thickly with a tall, tussocky grass, preferably 2 rows between the future tea rows. 2. Manure regularly with little or no forking. 3. Cut regularly and spread loppings all over surface. 4. Continue for preferably 2 years. *Soil activation.* 1. Cut grass right out. 2. Leave grass stumps whole on the surface. 3. Broadcast manure. 4. Hole, incorporating decomposed grass thatch in the holes. *Planting.* Use selected, well fed, basket plants; plant firmly and shade if necessary.

1945. Garayar, H. N.
Propagación vegetativa del té. **(Vegetative propagation of tea.)**
*Circ. Estac. exp. agríc. Tingo Maria* **52**, 1956, pp. 10.

In Peru bushes reserved for cuttings are grown under shade. Where there is an annual moist, cloudy season cuttings root in nursery beds under moderate shade and without the aid of growth substances. They are immersed in 0·04% nicotine sulphate to prevent pest infestation and the cut surfaces are treated with 0·25% Fermate before planting. Shade is gradually reduced after 6 months and the rooted cuttings are transplanted into permanent plantations when about 1 year old. Where no moist, cloudy season occurs, shaded propagating frames are used, in which water is maintained at a depth of 20 cm. throughout. Sawdust (usually mixed with half its volume of guano) or loamy soil is placed about 30 cm. thick on a perforated or wire-mesh sheet 10 cm. above the water.

1946. Evstaf'eva, V. A.
**Frost resistance in the tea plant.** [Russian.]
*Agrobiologija*, 1956, No. 4, pp. 56-61, illus.

Indian tea is stated to withstand up to −5° C., but some bushes of China tea in the foothill regions of the Kuban withstood −23° C. without snow cover and −34° C. with snow cover. Data are given showing that the absolute minimum (within given limits) does not appear to be decisive for the frost injury of tea. Overwintering depends on a combination of factors, in particular duration of frost, its alternation with warm periods, snow cover and the condition of the

plant. Regrowths from plants frozen to the root collar were found to possess increased frost resistance. The frost resistance of the first local seed generation was generally higher than that of plants raised from introduced seed.

1947. Chen, C.-T.
**A preliminary study on coordinated leaf-soil analysis for managing tea soils.** [English, with Chinese summary.]
*Mem. Coll. Agric. Nat. Taiwan Univ.*, 1956, **4**(2): 76-94, bibl. 25.

Analytical data obtained from leaf and soil samples collected from experimental plots at the Pinchen Tea Experimental Station and from 87 tea fields in Kwanshi county are presented. The Experimental Station samples showed positive correlations between leaf N, leaf K and yield, but there was no correlation between leaf K and soil K, nor between leaf K and yield in samples from the other soil series in Kwanshi county. The field survey revealed that the soil series, the season of harvest and the variety were the chief factors affecting both leaf composition and yield under common cultural practices. Soil type, site and bush age were of minor importance. J.R.L.

1948. Kawai, S., and Ishigaki, K.
**Absorption of $P^{32}$ by the tea plant (Preliminary experiment).** [Japanese, with English summary 9 lines.]
*Study of Tea, Tôkai-Kinki agric. Exp. Stat., Tea Div.*, 1956, No. 14, pp. 34-6, bibl. 8.

When tea plants were grown in $P^{32}$ culture solution $P^{32}$ accumulated first in the roots and then moved to stems and leaves. The higher the $P^{32}$ concentration of the solution and the longer it was supplied to the plants, the greater was the accumulation of $P^{32}$ in the leaves, stems and roots. When $P^{32}$ was applied to the undersides of the leaves more was absorbed than when it was applied to the upper surfaces. J.R.L.

1949. Harada, S., and others.
**Studies on the maturity of tea leaves. Experiments in 1955.** [Japanese, with English summary 15 lines.]
*Study of Tea, Tôkai-Kinki agric. Exp. Stat., Tea Div.*, 1956, No. 14, pp. 1-13, bibl. 2.

The relationship between the maturity of the leaves, as indicated by the percentage of banji [dormant] leaves, and shoot growth, yield, quantity and chemical composition of the leaves was studied during the second and third plucking seasons of 1955 on 5 varieties, four of them green and one black. The results showed that with all the varieties plucking should be done before the banji percentage exceeded 90. J.R.L.

1950. Minamikawa, J., Ueda, K., and Osakabe, M.
**Experiments on the control of the mulberry scale. (*Pseudaulacaspis pentagona* Targioni Tozzetti.) (Part 2.) Gas dispersion under sheets covering the tea bushes during cyanide fumigation.** [Japanese, with English summary 9 lines.]
*Study of Tea, Tôkai-Kinki agric. Exp. Stat., Tea Div.*, 1956, No. 14, pp. 15-28, bibl. 3, illus.

Although the cyanide gas dispersed better when the pot method was used this was somewhat difficult to operate, and it proved more satisfactory to cover two rows of bushes with a double vinyl sheet and apply the fumigant with a duster at each end between the rows of bushes. J.R.L.

1951. Minamikawa, J., and Satô, R.
**An estimation of organo-phosphorus spray residues on dried tea leaves.** [Japanese, with English summary 9 lines.]
*Study of Tea, Tôkai-Kinki agric. Exp. Stat., Tea Div.*, 1956, No. 14, pp. 28-9.

Dried tea leaves, which had been plucked in the day they were sprayed, contained 50–80 p.p.m. parathion, but leaves harvested 3 weeks later had less than 1 p.p.m. Sumicide (ACC 4124) residues became negligible within 10 days of spraying. J.R.L.

### *Sundry crops.*

(*See also* 1959p, t, 1960j, r, x, 1961f.)

1952. Venkataratanam, L., and Satyanaranaswamy, G.
**Vegetative propagation of *sitaphal* (*Annona squamosa* Linn.).**
*Indian J. Hort.*, 1956, **13**: 90-101, bibl. 9, illus.

With cuttings of custard apple neither the kind of shoot nor its position had any effect on strike, which never exceeded 2%. Approach grafting gave much better results than layering and air layering, the best months being August and September. Results from shield budding were better than from side grafting; the most favourable months for budding were January, March and June. By topping the rootstock about a fortnight after bud inspection, the take was improved.—Hort. Sect., Dep. Agric., Hyderabad.

1953. Bavappa, K. V. A.
**Merits of different nursery practices in arecanut cultivation.**
*Arecanut J.*, 1956, **7**: 61-3, bibl. 4.

Sprouting seed nuts in loosely-tied straw bundles and then planting in the nursery gave low germination (84·5%) and poor establishment in the nursery (76%). Direct sowing in the nursery gave 95% establishment. Seedling growth was stronger after direct sowing than with transplanting.—Centr. Arecanut Res. Stat., Vittal.

1954. Raghavan, V., and Baruah, H. K.
**On factors influencing fruit-set and sterility in arecanut (*Areca catechu* Linn.): I. Studies on pollen grains.**
*Arecanut J.*, 1956, **7**: 48-56, bibl. 11.

Classification of arecanuts into 5 groups was based on fruit size. Fruit set ranged from 45·7 to 65·5% of the total number of female flowers produced. Sterility was higher in types with large-sized fruits than with the smaller-fruited types. The percentage of sterile pollen grains in the types studied varied from 3 to 100%. In pollination studies with artificial media maximum germination, associated with long germination tubes, was observed in grains germinating during the first 2–4 hours after maturity. Germination was poor at both 20° and 35° C. Stigmas were most receptive when the flower was slightly open.—Gauhati Univ., Gauhati, India.

1955. NAMBIAR, K. K.
**Manuring of arecanut plantations.**
*Mysore agric. Cal. 1955*, 1956, pp. 65-6.
Trials at Marthur indicate that in a garden of 400 trees per acre a combination of 100 loads FYM, 5 loads leaf manure, followed by the application of a mixture of 200 lb. groundnut cake, 80 lb. ammonium sulphate, 400 lb. supers and 300 lb. $K_2SO_4$ once every 3 years is likely to give satisfactory returns.

1956. VENKETRAM, T. M.
**Abnormal inflorescence in breadfruit (*Artocarpus altilis* Fosb.).**
*Sci. and Cult.*, 1956, **22**: 286, bibl. 1, illus.
At the Agricultural College, Coimbatore, a breadfruit tree was noticed in which a bisexual inflorescence occurred among the normal unisexual inflorescences. The normal female flowers were borne as usual at the apical end of the spike, but near the basal end and along the rachis there occurred some more female flowers interspersed with male and hermaphrodite flowers. All these abnormal flowers were younger than the normal ones. Possible reasons for the abnormality are discussed.

1957. KINCL, F. A., AND OTHERS.
**The constituents of *Casimiroa edulis* Llave et Lex. Part I. The seed.**
IRIARTE, J., AND OTHERS.
**Part II. The bark.**
*J. chem. Soc. Lond.*, 1956, pp. 4163-9, bibl. 13, and pp. 4170-3, bibl. 11.
The 6 substances isolated from the fruit of *Casimiroa edulis* by Power and Callan in 1911 were found to be present in the seed, and in addition a further 7 substances were isolated. Of these two have been identified as palmitamide and *N*-benzoyltyramine, and the second of these, being related to the active principle of ergot, may be responsible for some of the medicinal activity attributed to the seed. Investigation of the trunk and root bark yielded 12 substances, of which 3 appear to be new and the others comprise 3 coumarins, 3 furanoquinoline alkaloids, a flavonoid and 2 substances, zapotin and casimiroin, previously isolated from the seed. The major constituent of the seed, casimiroedin, was not found in the bark.—Syntex S.A., Apart. Post. 2679, Mexico D.F., Mexico.

1958. MOSCOSO, C. G.
**West Indian cherry—richest known source of natural vitamin C.**
*Econ. Bot.*, 1956, **10**: 280-94, bibl. 16, illus.
Fruit of *Malpighia punicifolia* yields from 1,000 to 4,000 mg. ascorbic acid per 100 g. edible matter. Information is given on botany, factors affecting ascorbic acid content, selection, propagation, culture, pest and disease control and the economic prospects of the crop.

***Noted.***

1959.

a DE ALMEIDA LEME, H.
Mecanização da cafeicultura. **(Mechanization of coffee growing.)**
*Bol. Super. Serv. Café, S. Paulo*, 1955, **30**(344): 7-19, illus.
Methods and problems in Brazil.

b ANDRADE, A. C.
Observações sôbre a banana brasileira no mercado inglês. **(Observations on Brazilian bananas in the English market.)**
*Biológico*, 1956, **22**: 165-76, bibl. 5.
Packing, transport and fruit rots discussed.

c ANON.
**Manuring the mango—right doses.**
*I.C.A.R. Farm News Release* **184**, from abstr. in *South Indian Hort.*, 1956, **4**: 33.
Amounts of F.Y.M., bone meal and wood ash for trees of different ages.

d ANON.
**Notes on the botany of the oil palm. 2. The seedling.**
*J. W. Afr. Inst. Oil Palm Res.*, 1956, **2**(5): 92-5, illus.
Part 1 was noted in *H.A.*, 26: 3191a.

e ANON.
**Pineapples can be chemically forced.**
*Fmg S. Afr.*, 1956, **32**(9): 17-19, 22, illus.
Precautions to eliminate bruising, and forcing the last Cayenne crop before replanting.

f BAPTIST, N. G.
**γ-Amino-butyric acid and other free amino-acids in the coconut.**
*Nature*, 1956, **178**: 1403-4, bibl. 9.
In various developmental stages of the endosperm.

g BARRETO DOMÍNGUEZ, R.
Estudios comparativos con nuevas variedades realizados por la estación experimental de la caña de azúcar de Jovellanos. II. Resultados del primer retoño. III. Primeros resultados en el experimento del central Francisco. **(Comparative studies carried out with new varieties by the sugar cane experimental station at Jovellanos. II. Results of the first ratoon crop. III. First results of the experiment at the Francisco centre.)**
*Mem. XXIX Conf. an. Asoc. Téc. azuc. Cuba, 1955*, pp. 17-25, bibl. 2.
For part I see *H.A.*, 25: 4449h.

h BIESKE, G. C.
**Varietal trials—1954 and 1955 seasons.**
*Cane Grs' quart. Bull.*, 1956, **20**: 46-52.
In Queensland.

i BUCKLEW, L. L.
**The mango in California.**
*Yearb. Calif. Avoc. Soc. for 1956*, pp. 68-9.
Earlygold most promising of 32 varieties.

j CANN, H. J.
**The packing of bananas.**
*Agric. Gaz. N.S.W.*, 1956, **67**: 408-12, 470-81, illus.
Packing house layout and methods.

k CHILD, R.
**The spelling of "coconut".**
*Chem. Ind. Lond.*, 1956, No. 51, p. 1522.
Historical aspects of the coco—cocoa muddle.

l CONSTABLE, D. H.
**Girth and growth measurements as an aid to manurial diagnosis of *Hevea brasiliensis*.**
*Quart. Circ. Rubb. Res. Inst. Ceylon*, 1956, **32**: 13-17.
For another account see *H.A.*, 26: 1180.

m COWGILL, W. H.
Siembra del cafeto al sol. **(Planting coffee without shade.)**
*Bol. agric. Minist. Agric. Guatemala* **3**, 1955, pp. 18, illus.
See *H.A.*, 24: 4329.

n DAVIS, T. A.
**How to grow coconuts in cyclone areas.**
*Bull. Indian centr. Coconut Cttee*, 1956, **10**: 101-7.
Measures to minimize injury and to rehabilitate damaged areas.

o DORADO BERNAL, E., AND BOUCHER, M.
Détermination chromatographique de certains constituants du latex. **(Chromatographic determination of certain mineral constituents of latex.)** [French and English.]
*Rev. gen. Caoutch.*, 1956, **33**: 893-6 [French] and 923-7 [English], bibl. 8, illus.
Methods and preliminary results.

p DORASAMI, L. S.
**A brief note on areca industry in Mysore State.**
*Arecanut J.*, 1956, **7**: 58-61.

q DUGAS, A. L., AND COCKERHAM, K. L.
**How to check fields for sugarcane borer infestation.**
*Agric. Ext. Publ. La St. Univ.* **1195**, 1956, 1 folded sheet, illus.
To determine when control measures are needed.

r FLANDERS, S. E.
Una valuación de la situación de las hormigas en plantaciones de café colombiano, abril de 1956. **(An appraisal of the ant situation in plantations of Colombian coffee, April 1956.)**
*Rev. cafet. Colombia*, 1956, **12**: 4302-10.
Studies on effects and control suggested.

s GARAYAR, H. N.
Almácigos de café y el control de los nematodes. **(Coffee nurseries and nematode control.)**
*Bol. trim. Exp. agropec. P.C.E.A., Lima*, 1955, **4**(4): 6-8.
Including seed disinfection and planting *Crotalaria spectabilis* for nematode control.

t GOKHALE, G. P.
**Arecanut cultivation practices in India.**
*Poona agric. Coll. Mag.*, 1956, **47**: 26-30.
Information presented in tabular form.

u GOMES DA SILVA, J.
Adubação verde. Metodo prático de produzir matéria orgánica no próprio cafèzal. **(Green manuring. Practical method of producing organic matter on the plantation itself.)**
*Bol. Super. Serv. Café, S. Paulo*, 1956, **31**(349): 11-26, bibl. 18, illus.
Economics of green-manuring in São Paulo coffee plantations.

v GOVINDARAJAN, S. V.
**Anhydrous ammonia as a nitrogenous fertilizer.**
*Bull. Chem. Ser. Dep. Agric., Mysore St.* **4**, 1956, pp. 16, bibl. 4 + 16, illus.
Including non-significant results on sugar cane in comparison with sulphate of ammonia.

w GOVINDARAJAN, S. V.
**Manures and fertilizers. Manurial formulae for the principal crops of Mysore State.**
*Bull. Chem. Ser. Dep. Agric., Mysore St.* **1**, 1955, pp. 26, illus.
Including sugar cane, tobacco, ginger, vegetables, areca palms, bananas, cardamoms, coconuts and coffee.

x GREGORY, P. J.
**Coconut acreage in the re-organised states of India.**
*Bull. Indian centr. Coconut Cttee*, 1956, **10**: 97-9, 107.

y GUTERRES SOARES, R. N.
A irrigação dos cafèzais. **(Irrigation of coffee plantations.)**
*Bol. Super. Serv. Café, S. Paulo*, 1955, **30**(342): 27-37.

z HALL, D. W.
**The copra industry of Zanzibar.**
*Colon. Plant Anim. Prod.*, 1955 (issued 1956), **5**: 305-8, illus.

1960.

a HARADA, S., AND OTHERS.
**Studies on the rapid tannin test of tea leaves. Re-examination of the reaction to potassium bichromate.** [Japanese, with English summary 8 lines.]
*Study of Tea, Tôkai-Kinki agric. Exp. Stat., Tea Div.*, 1956, No. 14, pp. 13-15, bibl. 3.
Reaction to potassium bichromate no guide to tannins.

b HARLER, C. R.
**Selection of the tea plant.**
*World Crops*, 1957, **9**: 28-32, illus.
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c HUBERT, F. P.
**Diseases of some export crops in Indonesia.**
*Plant Dis. Reptr*, 1957, **41**: 55-63, bibl. 23, illus.
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d HUGHES, C. G.
**Leaf-scald disease and Q.57.**
*Cane Grs' quart. Bull.*, 1956, **20**: 69-71, illus.
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**The cultivation of coconuts.**
*Fmr Jamaica*, 1956, **60**: 233-6.
Soil preparation, planting, maintenance and varieties.

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**The photometric determination of chlorophyll in tea leaves.** [Japanese, with English summary 13 lines.]
*Study of Tea, Tôkai-Kinki agric. Exp. Stat., Tea Div.*, 1956, No. 14, pp. 29-33, bibl. 3.
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Métodos de anláise química de folhas de cafeeiro. **(Methods of chemical analysis of coffee leaves.)**
*Rev. Café. portug.*, 1956, **3**(10): 45-62, illus.
Preparation of samples and methods of determining N, P, K, Ca and Mg.

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**Planting and after-care of coconut seedlings.**
*Mysore agric. Cal. 1955*, 1956, pp. 99-101.
Notes on 3 Government nurseries and recommendations on planting, etc.

i LEBLANC, R. J.
**New method of stalk sampling and trash testing as is practised at Raceland Factory, Godchaux Sugars, Inc.**
*Sugar J.*, 1956, **19**(6): 24-6, illus.
Samples collected mechanically instead of by hand.

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**Characterization of the pigment in red tamarind (*Tamarindus indica*, Linn.).**
*Curr. Sci.*, 1956, **25**: 325-6, bibl. 8.
An anthocyanin, probably chrysanthemin.

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Envassouramento do *Coffea congensis*. **(Witches' broom of *Coffea congensis*.)**
*Bol. Super. Serv. Café, S. Paulo*, 1955, **30**(345): 8-11, bibl. 2, illus.
Non-transmissible; genetical origin suspected.

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La culture de la canne à sucre dans l'Inde. **(Sugar cane growing in India.)**
*Rev. agric. sucr. Maurice*, 1956, **35**: 250-60.
A general account of problems and methods.

m MENDES, J. E. T.
Adubação do cafeeiro. **(Fertilizing coffee.)**
*Bol. Super. Serv. Café, S. Paulo*, 1955, **30**(342): 7-13.
Organic and inorganic fertilizers [see also *H.A.*, 26: 4255e].

n MENDES DA PONTE, A.
Elementos que devem informar os ensaios culturais com o cafeeiro. **(Factors of which account should be taken in cultural experiments with coffee.)**
*Rev. Café portug.*, 1956, **3**(10): 29-34.
Climate, soil, pests and diseases.

o MONTEALEGRE, M.
Cafetales a pleno sol versus cafetales a la sombra. **(Unshaded *versus* shaded coffee plantations.)**
*Suelo Tico*, 1956, **9**: 201-4.
Shade is necessary in Costa Rica.

p MORA URPÍ, J.
Origen y tipos de cacao. **(Origin and types of cacao.)**
*Suelo Tico*, 1956, **9**: 196-200, illus.
Including descriptions of *Theobroma pentagona* and *T. leiocarpa*.

q MORAIS, F. R. P.
Padrões de terra boa para cafèzal. **(Plants indicative of good coffee soil.)**
*Tempo*, 28th Jan. 1954, reprinted in *Bol. Super. Serv. Café, S. Paulo*, 1954, **29**(332): 63.

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**Processing of arecanuts.**
*Mysore agric. Cal. 1955*, 1956, pp. 102-3.
Slicing, boiling and drying tender [unripe] arecanuts.

s NAYLOR, A. G.
**Papers on "lethal yellowing" and "frond drop" diseases of coconuts.**
*Fmr Jamaica*, 1956, **60**: 237-9.
Symptoms and recommended control measures.

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**The harvesting, handling and packing of bananas for export.**
*Agric. J. Dep. Agric. Fiji*, 1956, **27**: 33-7, illus.
General recommendations for packing Fijian bananas in wooden boxes.

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**Problems in pineapple flower induction.**
*Qd agric. J.*, 1956, **82**: 585-8, illus.
Including recommended times of treatment with acetylene or NAA.

v PARRA H., J.
Métodos micro-analíticos de tejido vegetal. **(Micro-analytical methods for plant tissue.)**
*Bol. inf. Café, Chinchiná-Caldas*, 1956, **7**: 214-20, bibl. 16.
With special reference to coffee.

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Chiffres comparatifs du calcul de la richesse des cannes. **(Comparative figures for calculating the sugar content of canes.)**
*Rev. agric. sucr. Maurice*, 1956, **35**: 264-5.
Results with the Java ratio and official methods compared.

x RAMASWAMI, K.
**Selected references on mangosteen (*Garcinia mangostana* L.).**
*South Indian Hort.*, 1956, **4**: 31-2, bibl. 40.
A bibliography.

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**Development of a sugar-cane harvester.**
*Agric. Engng St. Joseph, Mich.*, 1956, **37**: 821-4, bibl. 2, illus.
Progress in developing an improved harvester suitable for Louisiana.

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**Preservation of budwood.**
*South Indian Hort.*, 1956, **4**: 3-12, bibl. 44.
A review, including special measures necessary in the tropics.

1961.

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**Ultra-low-volume spraying in Africa.**
*World Crops*, 1957, **9**: 60-2, illus.
For crops which included coffee, wattles and bananas.

b RUBBER RESEARCH INSTITUTE OF MALAYA.
**Planting recommendations, 1957-8.**
*Plant. Bull. R.R.I.M.*, 1957, No. 28, pp. 10-14.
Recommendations on clones.

c RUBBER RESEARCH INSTITUTE OF MALAYA.
**Tapping young rubber—revised recommendations.**
*Plant. Bull. R.R.I.M.*, 1957, No. 29, pp. 25-7.
For both seedlings and budded trees.

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Métodos de plantio. **(Planting methods.)**
*Bol. Super. Serv. Café, S. Paulo*, 1955, **30**(343): 8-10.
For coffee on virgin and cultivated land.

e SCARANARI, H. J.
Tratos culturais do cafeeiro. **(Cultural practices for coffee.)**
*Bol. Super. Serv. Café, S. Paulo*, 1955, **30**(344): 20-4.
Weeding, pruning, green manuring, intercropping and harvesting discussed.

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**Cherimoyas, sapotes, and guavas in California.**
*Yearb. Calif. Avoc. Soc. for 1956*, pp. 49-56, illus.
*Annona cherimola, Casimiroa edulis, Psidium guajava, P. cattleianum* and *Feijoa sellowiana*.

g SIMMONDS, N. W.
**Botanical results of the banana collecting expedition, 1954-5.**
*Kew Bull.*, 1956 (issued 1957), No. 3, pp. 463-89, bibl. in text.
Notes on 19 *Musa* spp. and subspp. found in S.E. Asia, S. Pacific and Queensland [see also *H.A.*, 27: 951v].

h SNETHLAGE, P.
Mechanisatie in de rubbercultuur. **(Mechanization in rubber growing.)** [English and Indonesian summaries ½ p. each.]
*Bergcultures*, 1956, **25**: 511-23.
A survey with particular reference to tractor types in use or required.

i STOVER, R. H.
**Studies on *Fusarium* wilt of bananas. I. The behavior of *F. oxysporum* f. *cubense* in different soils.**
*Canad. J. Bot.*, 1956, **34**: 927-42, bibl. 16, illus.
Conditions encouraging spread studied.

j TEIXEIRA MENDES, J. E.
Sistema brasileiro de plantar café. **(The Brazilian system of planting coffee.)**
*Bol. Super. Serv. Café, S. Paulo*, 1956, **31**(349): 7-10, illus.
With 3 plants per hole.

k TOSELLO, R. N.
Irrigação do cafèzal. **(Irrigation of coffee plantations.)**
*Bol. Super. Serv. Café, S. Paulo*, 1955, **30**(346): 11-17, bibl. 6.
General principles and their application to Brazil.

l VENKATAKRISHNIAH, N. S.
**Some common diseases of fruit plants in Mysore.**
*Mysore agric. Cal. 1955*, 1956, pp. 177-88.
Incidence and control.

## NOTES ON BOOKS AND REPORTS.

### *Books.*

1962. BATES, W. N.
***Mechanization of tropical crops.***
Temple Press, London, 1957, 9×6 in., pp. 410, illus., 45s.

Some years ago the reviewer was concerned, though fortunately not too directly, with the introduction to a tropical island of a variety of implements and sprayers for trial. All these units were well tried and respected in their countries of origin, but, transferred to a new environment and to new operators, their performances were most varied, some behaving admirably and others being of little use. There were also the reviewer's own car, which did 33 m.p.g. in England, but consistently refused to do more than 21 m.p.g. in the tropics, and an efficient little two-wheeled tractor, designed to work at a good smart pace in the invigorating climate of its home country, which proved altogether too much of a good thing for an operator using it in a banana plantation at temperatures exceeding 90° F. Had Mr. Bates' book been available in those days it is probable that many mistakes could have been avoided.

The book is divided into three parts. In part I, comprising 4 chapters, there is a discussion of the ways

in which crop production in the tropics differs from that of temperate countries. Both climate and soil and the interrelationships between the two are examined, as are the problems superimposed on them by soil conservation and drainage measures.

Part II consists of 8 chapters on mechanization, in which tractors, implements and equipment for transport and for pest, disease and weed control are discussed, together with the ancillary problems of fuel oils and their supply, the organization and management of machines, and technical education.

Part III comprises 15 short chapters, each devoted to a crop or group of crops, amongst which are fruits, fibres, tobacco, pyrethrum and all the major plantation crops. The approach here represents a departure from the usual one, which aims at enlightening the grower. Instead, the main purpose is to provide the manufacturer with factual details, which will help him to understand the problems of mechanization peculiar to each crop and at the same time indicate to him the great potential market that tropical crops will ultimately offer for his machinery.

Embodied in this compact and well illustrated book is a wealth of practical information on mechanization as applied to both large-scale and peasant agriculture in different parts of the British Commonwealth, and it should be of value alike to the maker of machines and to those who wish to use them under tropical conditions. G.K.A.

1963. Booth, C. O.
*An encyclopaedia of annual and biennial plants.*
Faber & Faber, London, 1957, $10\frac{1}{2} \times 6\frac{1}{2}$ in., pp. 488. 84s.

At first sight it might seem that this massive effort is worthy of a better cause. Annuals and biennials are ephemeral things and to consecrate a book to them weighing three pounds and costing about two shillings per oz. might seem to be rather overdoing things. However, the book itself will soon dispel any idea that annuals and biennials are plants sold in coloured packets for filling gaps and odd corners, for the author has brought to notice an enormous number of varieties from all over the world. It is fair to say that most gardeners have no idea that such splendid material not only exists but, more, can be obtained. Mr. Booth makes sure that there will be no future excuse for inactivity by including a five-page list of seedsmen and gardens abroad whence supplies may be procured. It covers some 25 countries, literally from China to Peru, or at least Chile, which is near enough. Mr. Booth has gone for his subject in a big way in the sense that nothing is too small to escape his attention, not even chromosomes. Part I of the book has chapters on plant characteristics, raising from seed, cultivation in the open and under glass, insect and other pests, parasitic and nutritional diseases. These are treated in no perfunctory fashion. Every insect pest, some fifty or so, has its secret life fully exposed, and very interesting some of them are. Parasitic and other diseases, even more numerous, are dealt with similarly, and in all cases recognition marks and control treatments are mentioned.

Part II is equally thorough. Here the kernel in the nut is the descriptive list of genera and species, which, with many illustrations, occupies 286 pages and deals with 1,400 species, alphabetically arranged, of which the author has grown more than 1,200 under a wide range of cultural conditions. Hence he can speak from experience, though as he says, his views do not always agree with those expressed by other writers.

The descriptive list is reinforced by a glossary of botanical terms, English equivalents of specific names, Latin equivalents of popular names, a list of chromosome numbers, the addresses of seedsmen and of firms manufacturing recommended insecticides and fungicides. There is a general index to Part I, an index of pests, an index of diseases and pathogens, and there are lists of plants for practically every position, season and combination of seasons, with appropriate seasonal border plans to the number of ten. More and more lists keep bobbing up throughout the book, but enough has been said to show that as an example of painstaking thoroughness this book will be difficult to match. G.St.C.F.

1964. Broadbent, L.
*Investigation of virus diseases of brassica crops.*
Cambridge University Press, 1957, $10 \times 6\frac{1}{2}$ in., pp. vii+94, bibl. 54, illus., 15s., being *Agric. Res. Coun. Rep. Ser.* **14**.

Virus diseases caused severe losses in brassica crops in England in the years just after World War II, and the Agricultural Research Council asked Dr. Broadbent, of Rothamsted, to undertake a thorough study of the problem. This was done in cooperation with Advisory Officers of the N.A.A.S. and a number of growers. The result is a report bulging with detailed data—the product of a happy marriage between a study of the epidemiology of the diseases in the field and the behaviour of the viruses themselves in the laboratory. The author has also drawn, where appropriate, from information obtained in the U.S.A.

We are told briefly of the pattern of brassica cultivation in England and Wales over the past quarter-century; how the acreage of brassicas increased between 1940 and 1948, and how this was paralleled by a rise in incidence of brassica virus diseases up to epidemic proportions. The two principal virus diseases, cauliflower mosaic (ClMV) and cabbage black ring spot (CBRSV) are dealt with in detail; the symptoms and their many modifying factors, and the effects on yield, are based on large-scale field trials. Manurial trials indicated that high levels of nitrogen resulted in more plant deaths in cauliflower during the winter than did ClMV!

Experimental host range and species of aphids which can transmit ClMV and CBRSV are listed. The author has tried to assess the relative importance of the two main vector species, *Myzus persicae* and *Brevicoryne brassicae*, although the task is a difficult one, and there is evidence that either species can play the dominant role. The importance of infection at the seed-bed stage is stressed, and various lines of attack on the diseases at this stage are compared. Insecticidal spraying had little effect on virus incidence, but barrier crops, especially barley, reduced the incidence of virus to about one-fifth. Barrier crops are perhaps the most important practical recommendation in the report for, as the author says, "The four years' studies have added

many details to our knowledge about the epidemiology of cauliflower mosaic and cabbage black ring spot but little to the basic recommendations for control made in 1950". True, but most of the earlier advice was based on common sense and extrapolation of measures successful in controlling other virus diseases. All too often, successful use of control measures based on intelligent guesswork leads in time to acceptance as Gospel of the implied principles underlying them. This is dangerous, and in giving us a broad and thorough foundation of basic data, Dr. Broadbent has provided factual evidence of many things hitherto only assumed to be so.

Nearly the whole book deals with ClMV and CBRSV, but turnip yellow mosaic and turnip crinkle viruses are concisely described; though at present of more interest to virus workers than a threat to brassica growing, these two viruses offer a serious potential danger. Even now, TYMV (virus workers wallow in initials) does considerable damage locally in parts of Northumberland and Durham. Finally, in four and a half pages there is a first-class summary; here, the overworked or indolent can extract, pre-digested, nearly all the essential facts, without having to consider the evidence.

If one must criticize, the only points which the reviewer would suggest would be some simplification of the arbitrary categories of symptom severity and type; all virus workers know the inherent variations of symptoms, both in degree and kind, and it is doubtful whether the finer details of plant reactions would be repeatable in the field. Perhaps also, the details of seed sowing methods and spacings, and their merits, are of rather more horticultural concern than directly related to virus disease, and they might be condensed. However, these criticisms are trivial, and merely emphasize how good is the stuff of which the report is made.

The standard of printing, the comprehensive index and most of the photographs, are safely above criticism. And in these hard times, fifteen shillings seems a very reasonable price. M.H.

1965. DENT, H. C. (EDITOR).
*The year book of technical education and careers in industry, 1957.*
A. & C. Black, London, 1957, 8×5½ in., pp. 1009, 25s.

Agriculture and horticulture are by no means neglected in this reference work. In the first part are details of the facilities offered at Universities in Great Britain. This is followed by a section devoted to the county institutes, some of which like that at Writtle in Essex cater for horticulturists. Finally a short section is devoted to the scope of a horticultural career and a general discussion of training possibilities and of qualifications which can be acquired and are desirable. D.A.

1966. EDMOND, J. B., MUSSER, A. M., AND ANDREWS, F. S.
*Fundamentals of horticulture.*
McGraw-Hill Book Co., N.Y., Toronto, London, 2nd Edition, 1957, 9½×6 in., pp. 456, bibls, illus., $6.75 or 50s. 6d.

In the 6 years that have elapsed since the appearance of the first edition [see *H.A.*, 22: 1987] of this textbook for short college courses, there has been rapid development in horticultural techniques and important changes in commercial practice. In revising the text the authors have noted some of these developments. For instance, new information is included on the use of pre-harvest drop sprays in apple orchards, the replacement of sour orange by sweet orange rootstocks for citrus in areas where quick decline disease is prevalent, the liquid method of applying fertilizers, and the use of sawdust for mulching. Reference is also made to one or two of the newer chemicals for pest and weed control. There are still, however, many notable omissions. Although the book is admittedly intended as an outline for beginners, it is surprising that the revised edition makes no mention of such important modern developments as blossom and fruit thinning by growth substances, the use of antibiotics for disease control, mist propagation of cuttings, or the production of nursery stock in metal containers. Although information on horticultural practices has been incompletely brought up to date, the basic principles of plant growth, to which the major portion of the book is devoted, are well and concisely presented. P.R.-D.

1967. GALET, P.
*Cépages et vignobles de France. Tome 1. Les vignes américaines.* **(Vines and vineyards of France. Vol. 1. The American vines.)**
École nationale d'Agriculture de Montpellier, 1956, pp. 670, bibl. 304, illus., 1,500 francs, post free.

The first volume of this authoritative work is concerned wholly and comprehensively with American vines and their hybrids. After two short explanatory chapters on ampelography and systems of classification the author considers in chapter 3 classification according to growth phenomena, taking in turn different parts of the vine and describing how they develop and afford a key to identification. In chapter 4 (pp. 53–110), the author deals with the chief American varieties, both as regards their use in America and their use elsewhere as rootstocks for *Vitis vinifera*. From this follow the two largest sections of the book, viz. Chapter 5 (pp. 111–381) on rootstocks and their individual characteristics and Chapter 6 (pp. 383–597) on direct producers.

Great stress is laid on the aptitude of the different rootstocks for particular conditions such as soils of high lime content, drought, soil salinity, and on their vigour, growth cycles, etc. No less usefully the aptitude of different direct producers for particular conditions is discussed. They are grouped according to the breeders responsible for their creation, e.g. Baco, Couderc, Ravat, Oberlin and others.

For anyone working on the improvement of vine rootstocks this book would appear to be indispensable. Volume 2 will be eagerly awaited. D.A.

1968. HAARER, A. E.
*Modern coffee production.*
Leonard Hill [Books] Ltd., London, 1956 10×6½ in., pp. 467, bibls, illus., 56s.

It commonly falls to our Bureaucratic lot to compile

lists of books for people who develop an interest in one or other of the major tropical crops. Sometimes this is an easy and almost pleasant task with one or two shiny new books to hand, but at other times the list looks depressingly like an antique bookseller's catalogue, and the books themselves are unerringly dated by their rather dim photographs of heavily bearded planters wearing unmistakably old-fashioned sun helmets. Perhaps coffee is not an extreme case, but, unless this reviewer's arithmetic is at fault, more than 20 years have elapsed since the last treatise in English on coffee growing appeared. And much can happen in 20 years.

Mr. Haarer has now filled the gap with a book that describes in great detail the practices used by East African coffee planters and summarizes and compares the methods used in other parts of the world. Nor does he neglect research work. The results of many experiments are tabulated in support of practical advice, and, if here and there rather more seems to have been read into the data than is strictly justified, the methods advocated appear to be sound and sensible.

In all there are 18 chapters dealing respectively with: early history; the economic species of *Coffea* and their confusing nomenclature; cytology, genetics and breeding, with special emphasis on the work done at Campinas; environment and physiology; shade and windbreaks; raising coffee from seed; vegetative propagation; starting a coffee plantation; lining, holing and planting; pruning; care and maintenance; harvesting and processing; diseases; pests; production in Africa; production in Asia and the Antipodes; production in the Western Hemisphere; and finally economic aspects of production. Each chapter ends with a list of selected references.

The author in his preface states that his aim has been to supply the planter, the student and the field extension offiver with an informative and interesting treatise in simple language. There may be some planters who feel that in doing this he has devoted rather too much space to certain well established practices, and there may equally well be field officers who feel that details of certain agricultural methods of a general nature, for example the installation of soil conservation measures, could have been shortened or omitted. Inevitably, in a book of this magnitude there are also occasional errors of fact, as for instance the cryptic statement on page 141 that for coffee "the soil should be near neutral, or have an acidity value between pH 4·5 and pH 5", and also errors of spelling, as in some of the Latin names used in the chapter on diseases. The book rather naturally took a long time to write and this means that certain recent developments, such as work on the serious tracheomycosis disease of coffee in West Africa and on weeds and their control in several countries receives little or no attention. These small and almost unavoidable defects apart, Mr. Haarer has produced a book that is full of useful, practical information and that makes for easy and pleasant reading.

The book is well printed and the photographs and other illustrations are mostly clear and helpful. There is also a useful subject index. At a price of 56 shillings it should be regarded as excellent value, and in any case what is 56 shillings to a coffee planter today!

G.K.A.

1969. HADFIELD, M.
*British trees. A guide for everyman.*
Dent, London, 1957, 8½×5½ in., pp. xxv+ 448 (+ index), illus., 30s.

This book describes the native and introduced trees most commonly seen in Britain. Identification is assisted by excellent line drawings of the leaves, twigs, flowers and fruit of all the species discussed. The author asks for criticisms. The only possible criticism of this able work is that a full length sketch of each tree, to show characteristic outline and habit of growth, might have accompanied the drawings of the floral and vegetative parts. The elms, for instance, are confusing. The leaves, etc., of 8 species are illustrated and there is a close resemblance between most of them. It is clear, however, from the text that each has a characteristic habit of growth. If a full length outline could have been given in each case the identification of the field would have had some of its difficulties reduced. That this would have been well within the author's competence is shown by excellent full length sketches of the Atlantic and Lebanon cedars, the only two drawings of this sort in the book. Among the general excellence the chapters on the Coniferales, describing and illustrating some 37 species, are particularly lucid.

Throughout the book the descriptive passages leave little to the imagination and the notes are enlivened, when the serious work is done, with tit-bits of information rather on the lines of a gossip column. The effect is to endow the tree with a personality and to heighten the interest of the reader. The book is designed for "Everyman", which presumably means those with a concern for trees but with little scientific knowledge. It has no pretensions, the author says, to being a scientific study. That is where we think he is wrong. Professional botanists are not likely to scorn these careful studies just because the style inclines to the "popular". Even botanists sometimes like a little jam with their pill. There is a small bibliography, chiefly of books about trees.

G.St.C.F.

1970. LECOUFLE, M., AND ROSE, H.
*Orchids.*
Crosby Lockwood, London, 1957, 7½×5½ in., pp. 112, illus., 17s.

This book is the translation of a French work, in which a well-known commercial orchid grower has collaborated with a botanist from the Paris Natural History Museum to produce an account of this fascinating family which should stimulate the interest of growers in many lands.

The greater part of it is taken up by a chapter devoted to descriptions of the chief genera and species, with brief cultural notes for each genus. This chapter is supported by superb photographs, both in colour and monochrome; these still bear their original French legends, but they are translated in the list of illustrations at the front of the book. Other chapters on geographical distribution, botany, general cultural details, and pests and diseases complete the work, which impresses by its clarity and conciseness and by the excellence of its illustrations.

E.M.J.N.

1971. MAKINS, F. K.
*Herbaceous garden flora.*
Dent, London, 1957, 9¼×6¼ in., pp. x+ 356 (+ index), 35s.

The subtitle describes the purpose of this book, "A guide to the identification of more than 1,000 species of herbaceous perennials, biennials and annuals cultivated in British gardens for ornament." Identification proceeds by way of a key to the families, a key to the genera, and 224 pages of line drawings followed by a brief description of each species. Any work of this nature must suffer from limitations of space. Even though garden hybrids, which form three quarters of the garden flora, are omitted, and, by the way, these are soon to be known as "cultivars" unless gardeners rally round to strangle this monstrous conception at birth, there still remain thousands of true species from which to choose. Inevitably a gardening reader will find many of his favourites left out.

The author has covered a great deal of ground, but it is possible to criticize his selection. Among Geraniums, for instance, at least 130 species have been cultivated at one time or another, and of these 30 and possibly more can now be found by examining nursery catalogues. The majority are low-growing "alpines" much planted in rock gardens. Here only four are depicted, three of them tall border plants and the fourth a rampant, if colourful, semi-weed which will quickly engulf everything within yards unless closely watched. The many charming and dainty species are ignored. Erodium which immediately precedes Geranium in the key has probably less than a dozen species in cultivation, yet four of these, two of them insignificant, are depicted. Of the Rudbeckias, those stolid tall perennials which keep things going in the autumn and form a welcome antidote to an overdose of Michaelmas Daisies only two are mentioned, neither of them perennial or typical and one is given an English name commonly applied to a different species. Campanulas come off better. H. Clifford Crook in his "Campanulas" has photographed 100 species. Seventeen are depicted here and the diversity of type pretty well brought out. The teeming families of Saxifrage and Primula must have provided headaches. They have been reasonably covered. Primula with 22 representatives cannot complain.

Whether the book will fulfil its purpose of enabling the comparatively untutored to identify their garden plants is open to argument. The neophyte floundering through the keys will almost certainly be bogged down and lost before reaching his goal, a familiar experience even to accustomed users of keys, and in this case the keys are not complete. The author rightly thinks that the common approach will be by way of the pictures, although line drawings, however accurate, by no means represent a sure means of identification. Finally there is the frustrating uncertainty as to whether the plant is there at all, and it must be admitted that in view of the huge numbers from which selection has had to be made, the chances will be that it is not. On the other hand the book does describe a very wide range of worthwhile plants from 668 genera and by using it as a guide a very interesting collection of botanical and garden value could be accumulated. G.St.C.F.

1972. Meteorological Office, Air Ministry, London.
*Observer's handbook*, 2nd edition, being *M.O.* **554**, H.M.S.O. Lond., 1956, 10×6 in., pp. 221, illus., 15s.

Chapter headings are: Observational routine; clouds; visibility; present weather and past weather; wind; state of ground; atmospheric pressure; temperature and humidity; rainfall; sunshine; special phenomena. Six appendices contain practical information.

1973. Peairs, L. M., and Davidson, R. H.
*Insect pests of farm, garden and orchard.*
John Wiley & Sons, N.Y., and Chapman and Hall, London, 5th edition, 1956, 9×6 in., pp. 661, bibls, illus., 68s.

The 1st edition was published in 1912 by E. Dwight Sanderson, the 4th in 1941 by Leonard M. Peairs. The illness and subsequent death of Dr. Peairs prevented his active participation in the 5th edition of the book, for which R. H. Davidson of Ohio State University is responsible.

The work may be best described as an elementary text-book of horticultural and agricultural entomology, mainly written for the students in the United States of America. It is hardly suitable for European students, since so many of the insect species referred to are peculiar to America, and do not occur in the old world. Most of text has been rewritten to bring it up to date and in line with present trends of thought. Introductory chapters deal with classification, structure and development, natural control, chemical control, the properties and uses of the large range of pesticides, and the details of formulations and equipment available for their application. Dilution tables and a table of conversions and equivalents are useful additions.

In the remaining chapters (Chapters 8–23) the pests are referred to briefly under the fruits, cereals, vegetables and other plants and stored products which they infest. The chief criticism of a book of this nature, and each State seems to publish its own version, is that the field covered is far too wide to allow of sufficient detail. There are no less than 577 figures and line drawings, mainly reproduced from publications of the United States Department of Agriculture, but many are too poor to enable the student to recognize the pest concerned. Descriptions of the life history of the pests also lack detail.

It is interesting to find that no less than fourteen pages are devoted to the subject of natural insect control; a promising trend when one remembers the days when the use of chemicals was the only method advocated, and possible alternative measures were not even considered. A.M.M.

1974. Rosenfeld, A. H.
*Sugar cane around the world.*
University of Chicago Press, 1956, 10×7 in., pp. 562, bibls, distributed by Sugar Publications, 604 5th Avenue, New York, $6.50.

Dr. Rosenfeld had a distinguished career in the sugar industry, first as Director of the Tucumán Sugar Experimental Station in Argentina and subsequently in Puerto Rico, Louisiana and Egypt. This last phase lasted from 1932 until shortly before his untimely death in 1942. The manuscript of the book now published was completed in 1941, but was only recently recovered from Egypt and prepared for publication.

This rather unusual background to a technical book is explained in an introduction by Dr. Pieter Honig, who emphasizes that had the author lived he would un-

doubtedly have wished to re-write certain sections in the light of much new knowledge gained in the past 15 years. One obvious example is a short section discussing weed control, although it may do no harm to remind the modern agronomist that sodium arsenite was first tested as a contact, inter-row herbicide in Hawaii some 40 years ago. Conceivably, too, the author would have wished to re-arrange some of his data, and perhaps also to have rounded off some sections by summarizing the salient features that emerge from his examination of field practices and research in many countries.

As it is, a vast amount of information has been rather loosely assembled in 8 chapters with the following headings: Origin and early history of sugar cane; botany, anatomy and physiology; composition of the cane; climate; sugar cane soils; soil fertilizers; preparation, drainage and irrigation; planting and cultivation practice. At the end there are 1,183 references arranged chapter by chapter up to Chapter VII. When we come to Chapter VIII, however, this rather curious statement occurs: "To expedite the publication of this book references in Chapter VIII have been omitted." In this chapter, on planting and cultivation practice, which only consists of 13 pages, the reference numbers, or at least a few of them, still appear in the text, and as some of these numbers exceed 300, it would appear that the bibliography was not the only part of the chapter to suffer from an urge to publish speedily.

It would be possible to criticize other signs of haste, such as errors of spelling, and also, so far as this old-fashioned reviewer is concerned, to take exception to split infinitives and the use of typewriter print. But, when all is said and done, Dr. Rosenfeld has given us, in addition to the benefit of his own experience, the most comprehensive review yet available of the literature on sugar cane agronomy from the earliest times up to 1940. In particular, sections dealing with soils, fertilizers and irrigation should prove valuable as a foundation on which to build a better understanding of present-day problems and needs. G.K.A.

1975. Singh, L. B., and Singh, R. N.
*A monograph on the mangoes of Uttar Pradesh. Vols. I and II.*
Superintendent, Printing and Stationery, Lucknow, U.P., 1956, 10×7½ in., Vol. I, pp. 150, bibl. 35, illus., Rs. 14, and Vol. II, pp. 141, illus., Rs. 13.

These attractively produced books are especially notable for the thorough way in which morphological characters that are of value for identifying mango varieties have been examined and for the very detailed descriptions of 150 varieties grown in Uttar Pradesh.

The method of classification resembles that used by Naik and Gangolly [see *H.A.*, 21: 1203], in that by taking the shape of the fruit and beak as characters of primary importance, six main groups are recognized. However, whereas Naik and Gangolly regarded leaf characters as of secondary importance, the two Singhs have taken venation of the stone (three groups) and panicle colour (four groups) as their secondary characters, making 12 classes altogether. The leaf characters, apex shape (two groups) and degree of folding (two groups) are treated as tertiary characters. Where two or more varieties fall within the same tertiary class final distinction is based on differences in the shape of apical and basal sinuses and leaves.

The varieties examined are grouped according to this classification, and for each of them tabulated information is provided on synonyms and on such characters as tree habit and size, cropping behaviour, times of blossoming and ripening, leaf characters including the colour of newly opened leaves, inflorescence characters, individual flower characters, and last, but in most detail of all, fruit characters. Each description is supported by a photograph, in some cases coloured, of a fruit and its stone. Possible minor defects are the lack of any size scales on the photographs and the absence of synonyms, in, say, italics in the variety index at the end of the book.

It is pleasant to be able to record that throughout the text and in the tabulated data the authors' have used simple, non-technical terms wherever possible. It is also pleasant to be able to record that both in the layout and print and in the reproduction of the photographs the standard is well above that often employed in the past by Government printers. G.K.A.

1976. Smith, K. M.
*A textbook of plant virus diseases.*
J. & A. Churchill, Ltd., London, 1957, 2nd edition, 9×6 in., pp. 652, bibls, illus., 65s.

The second edition of Dr. Kenneth Smith's classic textbook follows 20 years after the first. In this period man's knowledge of viruses has vastly expanded but not nearly to the extent that the number of known virus diseases has increased. It is not surprising, therefore, that the new edition bears little resemblance to the old. The differences are both quantitative and qualitative. The new edition deals with over 300 viruses compared with less than 150 in the original, but despite this increase and the inclusion of more information about many in the first edition, the new book is not much larger. This is chiefly owing to the exclusion of both the section on insect vectors and the appendix summarizing symptoms.

The book is sufficiently comprehensive to fulfil the normal demands on a textbook, although the claim (on the dust cover) to include "every disease so far described, affecting plants anywhere in the world" is obviously a publisher's exaggeration. Indeed, some omissions are puzzling as some symptoms merely suspected of being caused by viruses are included, such as cadang-cadang of coconuts and clover enations, while other established virus diseases like hop chlorotic disease and plum pox are omitted. Incompleteness is not a serious criticism, because new virus diseases are described so frequently that any list must soon become incomplete, but it does seem misleading to include as virus diseases those that may well prove to have another cause.

The most controversial aspect of the book is its arrangement. In the first edition a semblance of the natural order of living things was attained by grouping diseases under the generic name of the host arranged in plant families. Although the host ranges of viruses are not as restricted to related plants as was thought in 1937, this arrangement supported a nomenclature which has found wide usage outside Britain and especially in continental Europe. In the new edition all attempts at

classification have been abandoned and each disease is listed alphabetically under the common English name of the host in which it was first described. Closely related host plants are thereby widely separated in the book; for instance instead of *Prunus* virus diseases being together they are scattered under apricot, cherry, peach and plum with an even more artificial separation between those in plum and those in prune. Readers not very familiar with English names for plants will need constantly to refer to the index of Synonyms, but even this does not entirely avoid the language difficulty because some common synonyms are omitted. How does one refer to diseases of lucerne unless one remembers its Spanish-Arabic synonym "alfalfa"? To the reviewer it seems a false economy to dispense with a full index which could have replaced the index of synonyms without adding more than a few pages to the book.

The publishers are to be congratulated on the clear type and fine paper; the latter has contributed to clearer illustrations than those in the first edition and made a compact book for its 650 pages. Its price should not deter the student purchaser—it is a book of lasting value. A.F.P.

1977. Thompson, L. M.
*Soils and soil fertility.*
McGraw-Hill, N.Y., Toronto, London, 2nd edition, 1957, 9½×6½ in., pp. 451, bibls., illus., $6.50 or 49s.

This book is designed for the first course on soils taught in agricultural colleges of the U.S.A. Chapter headings are as follows: The physical properties of soils; soil moisture; the organic matter of soils; the chemical composition of soils; soil formation and classification; clay minerals, acidity and alkalinity; the principles and practices of liming; nitrogen; phosphorus; potassium; fertilizers; the utilization of farm manure; sulfur and the minor elements; variations in plant composition; crop rotations and soil fertility; and soil erosion and its control.

1978. Wellensiek, S. J., and Doorenbos, J.
*Grondslagen der tuinbouwplantenteelt.*
**(Fundamentals of horticulture.)**
Tjeenk Willink and Zoon N.V., Haarlem, 1956, 9×6 in., pp. 229, bibls., illus., fl. 14.50.

This book may be recommended to all those who wish to base their knowledge of horticulture on scientific principles—and who can read Dutch! Lectures delivered by Professor Wellensiek to the "candidaats" students at Wageningen Agricultural University have been used as a foundation, and adapted to form a book, thus the level is approximately that of the English horticultural degree. Temperate horticulture is the main concern of the authors, who draw freely for their examples on the work of the Horticultural Laboratory, Wageningen.

In the first part of the book an excellent account is given of plant physiology, and one is left with an impression of the effect of environment on the plant as a complete process rather than as a series of unconnected reactions. In the second half the emphasis is on plant propagation, both generative and vegetative, and includes a useful chapter on genetics. The bibliographies are limited to reviews of each subject. Throughout the book the practical aspects of horticulture are kept in the foreground, and it seems unfortunate that the barrier of language will prevent its appreciation by a wide audience. E.N.

## *Annuals and reports.*

1979. Agricultural Improvement Council for England and Wales.
*Third Report 1950-56,* H.M.S.O., London, 1956, pp. 38, 2s. 6d.

Subjects of particular interest to horticulturists briefly discussed in this report include: (1) The work of the Experimental Horticulture Stations with particular reference to cultivations, fruit, glasshouses, flower crops and vegetable crops. (2) Problems of a horticultural nature which concern the fruit nuclear stocks scheme, damage to crops by spray drift, damage to vegetables through wasting, bird pests of fruit, research on cider, perry and fruit juices and light irradiation of tomatoes. In appendixes are listed, with notes on their particular work, the 10 Experimental Horticultural Stations and Sub-stations and 3 Horticulture Demonstration Stations at present functioning.

1980. Alberta.
*Annual Report of the Department of Agriculture of the Province of Alberta for the year 1955,* 1956, pp. 186.

The report includes information on progress made at the new horticultural station at Brooks. Apple and plum orchards and soft fruits have been planted. A wide variety of vegetables is being grown, and also perennial flower crops.

1981. British Columbia.
*50th Annual Report of the Department of Agriculture, British Columbia, 1955,* 1956, pp. 144.

*Horticultural Branch* (pp. 21–42). Statistics of horticultural crops; demonstration work with small fruits, tomatoes and asparagus; manuring of prunes; apple scab control; chemical thinning of peaches with Elgetol (not recommended); weed control in cranberries, strawberries and asparagus; hoary cress control; storage of root crops in clamps. *Plant Pathology Branch* (pp. 42–5). Testing fungicides and the value of surfactants for apple scab control.

1982. Canada, Minister of Agriculture.
*Report of the Minister of Agriculture for year ended March 31, 1956,* pp. 157.

*Science Service:* Work reported on fruit crops concerns scab, fire blight, viruses, nematodes, peach replanting, mineral deficiencies, codling moth, mites, moths and other insects, spray programmes, heat therapy of small-fruit viruses. As regards ornamentals *Curvularia trifolii* on gladiolus, *Pythium ultimum* on saintpaulia and narcissus bulb fly have received attention. Work has continued on mist propagation methods. *Experimental Farms Service:* Goodland, a new apple from Morden ripens in mid-September and keeps till the end of the year. Two new Ottawa raspberries, Carnival and Comet, are discussed. Agassiz new strawberries have been distributed to growers for trial. Ferguson,

a new tomato from Ottawa, is superior to old varieties in yield and resistance to cracking. Incompatibility between certain apricots and peach rootstocks is noted. Captan and Terzan show promise in the control of damping-off diseases. Irrigation apparatus has been set up at Summerland, B.C., for tree fruits and at Smithfield, Ont., for tomatoes. Fertilizer effects on cucumbers and cranberries are noted. Progress is reported on indexing virus-free raspberry and strawberry stocks. Polythene box liners are showing promise for pear storage. Causes of deep scald in stored apples are under investigation. Physiological and biochemical work is in progress on composition changes in tobacco. Notes are given on Burley 1, an outstanding cigarette variety, Improved Briar the first root-rot-resistant heavy type to be developed with superior wrapper grade, and, among flue-cured varieties, White Gold, which is recommended for commercial production. Other work is noted on cultivation and rotation problems, spacing and curing.

1983. Cawthron Institute.
*Annual Report of the Cawthron Institute, 1955-56,* Nelson, N.Z., 1956, pp. 57.

Sir Theodore Rigg retired on 31st March 1956: The new director is Dr. D. Miller. Sir Theodore in his retirement has undertaken the care of the Annesbrook Research Orchard of the Institute. Investigations briefly discussed concern the following horticultural problems: *Hops:* Fertilizer trials, effects of Mg, B and Mo deficiencies, cone analysis, root analysis, hop resins, black root rot (*Phytophthora cactorum*). *Tobacco:* Chemical work on fertilizers, deficiencies of N and K, foliar spraying with urea, irrigation, boron effects, other minor element contents, spacing and cover crop effects on leaf composition, varieties, addition of Cu and Mo to soil, diseases (*Thielaviopsis basicola, Phytophthora cactorum, Verticillium dahliae* and *Rhizopus arrhizus*). *Fruit research:* Comparative merit of Double Vigour and Northern Spy apple rootstocks, collar rot (*Phytophthora cactorum*), chemical investigation of the effect of applying sodium molybdate to the soil of apple and pear orchards. *Tomatoes:* Fertilizers, pruning and soil treatments in the glasshouse, also soil insecticides and water culture. *Raspberries:* Fertilizers, minor element and cultural field studies and chemical analysis in the laboratory. Short signed articles [to be abstracted *H.A.*, Vol. 27, No. 3] concern different phases of hop investigations, tomato water culture and physiological disorders.

1984. Commonwealth Economic Committee.
**Fruit. A review of production and trade relating to fresh, canned and dried fruit, fruit juices and wine.**
[*Publ.*] *Commonw. Econ. Cttee*, 1956 (issued 1957), pp. 179, H.M.S.O., Lond., 5s.

This annual review contains up-to-date summaries of production, international trade and consumption of fruit, both temperate and tropical, with special reference to the part played by Commonwealth countries. Four appendices give information on fruit consumption levels, on fruit utilization in the United Kingdom, Canada, South Africa and the United States, on government measures affecting the import of fruit into the United Kingdom, and on import duties and trade regulations in the United Kingdom, Canada and several European countries.

1985. Cyprus (Allan, W.).
*Annual Report of the Department of Agriculture, 1955,* 1956, pp. 30.

This report, which gives the ordinary expected figures for production and exports, contains also a clear account of the natural resources of the island. The chief horticultural crops are citrus, vines, carobs, olives and tobacco, and in the last 10 years irrigation has resulted in increased exports of citrus, table grapes and vegetables.

1986. Cyprus (Soteriades, C.).
*Annual Report for 1955. Annexure VI. Annual Report of the Chemistry and Soils Section for 1955,* 1956, pp. 18.

Manurial trials with: (1) *Olives.* Sulphate of ammonia raised yields, but superphosphate and manure had no effect. (2) *Vines.* NPK had no effect on yields but the sugar content of grapes was slightly raised by K, when applied in combination with N. (3) *Oranges.* N increased yields by increasing weight and number of fruits. P reduced fruit size, due in part to the thinner skins of fruits from treated trees.

1987. Directie van de Landbouw, The Hague.
*Tuinbouwgids 1957.* **(Horticultural guide for the Netherlands, 1957.)**
The Hague, Netherlands, 1957, 9×6 in., pp. 802, illus., fl. 6 or 7 depending on binding.

In the fourteenth edition of this valuable Horticultural Guide new articles are included on economics in the general section and under separate crops, and new coloured plates are included on fruit and flower pests and diseases. Among the many other subjects treated are: favourite commercial fruit varieties, peach and plum varieties for growing under glass, qualities of narcissus varieties, heating installations for small quantities of tulips and gladiolus, and varieties of *Papaver orientale, Erica, Calluna vulgaris, Ribes sanguineum,* and *Lathyrus odoratus.*

1988. Horticultural Education Association.
*Scientific Horticulture 1955-56,* Gibbs & Sons, 16 Orange St., Canterbury, England, Vol. **12**, 1957, 9½×6 in., pp. 155, illus., 17s. 6d.

This volume should appeal to a much wider field than the members of the Association, in particular to horticulturists in the Advisory or Extension Services overseas. It consists of articles by authors eminent in their respective fields. Although it is impossible to allot them all satisfactorily to particular categories, it may roughly be said that 4 articles have a historical character and concern progress in horticulture, progress in physiology, vegetative propagation methods and strawberry breeding. Five tend to be of immediate practical value to the advisory officer. These cover the assessment of soil conditions, the management of fruit soils, soilless cultivation in the glasshouse, a colour chart on new principles [see abstract 1006], and precooling and $CO_2$ treatment of strawberries. Finally nine authors enunciate and discourse intelligibly—to

the layman—on the salient facts in the following problems or techniques: relationship between roots and soil organisms, flowering and environment, glasshouse environment, the engineer's approach to plant environment, the mushroom and its environment, environmental control in experimental work, radioactive tracers, chromatography and atmospheric pollution and plant growth. They are popular articles in the best sense of the word, in as much as they really are understandable, although several deal with fundamental issues. Being condensed reviews they do not lend themselves to abstracting and each should be read in its short entirety. [For those who may be interested a leaflet is enclosed in this number giving an exact account of authors and titles.] D.A.

1989. INDONESIA.
Verslag over 1955 van de Proefstations der Centrale Proefstations Verenigung. **(Report for 1955 of the Experiment Stations of the Central Union of Experiment Stations)**, cyclostyled, pp. 178.

Experimental details are given for the following crops: *Rubber:* Vegetative propagation, wood regeneration on tapping surfaces as affected by hormones; genetical studies; studies on *Helminthosporium hevea* and *Tarsonemus translucens*; cultural experiments, including manurial and tapping trials. *Coffee:* Treatment of robusta cuttings; tests of seedlings and clones; pests and diseases, including nematodes and mealybugs; cultural trials, including testing of propagation material, pruning and plant thinning. *Tea:* Studies on cuttings; improvement of seed production by growth hormones; testing seedlings resistant to blister blight; control of blister blight and mites; cultural trials, including pruning, shading and manuring. *Cinchona:* Cultural trials. *Cacao:* Chemicals to improve fruit set; incompatibility and pollination in nature; pests and diseases. *Tobacco:* Genetical studies; cultural trials including manuring and shading; pests and diseases, including viruses; cultural trials and manuring. *General studies:* machines, manures, chemical weed control, and soil studies.

1990. I.N.E.A.C.
Rapport annuel pour l'exercice 1955. **(Report of the work of the I.N.E.A.C. Stations, 1955.)**
*Publ. hors. Sér. Inst. nat. Ét. agron. Congo belge*, Brussels, 1956, pp. 568, 160 fr. belg.

This monumental work, beyond the ingenuity of the mere abstractor to deal with adequately, should surely be in the hand of all those responsible for research work under anything like similar tropical conditions. Separate articles or bulletins sooner or later give the whole story, but here are delineated the bare bones of what is happening at the numerous research centres in the Belgian Congo. A great deal of the information [up to page 264] concerns work directly under the Yangambi Research Centre, being classified under one of its 20 Divisions. The rest refers to experiments and agronomic investigations at Stations and sub-stations in the following Districts [Secteurs] of the country: Lower Congo, Central Congo, Northern District, Southern District, Katanga, Kivu, l'Ituri, Ruanda-Urandi [pp. 265–548]. The rest has to do with climatology, flora, forestry studies, libraries and publications. Plantation crops, fruits and vegetables are the subject of most of the present investigations.

1991. INSTITUUT VOOR TUINBOUWTECHNIEK, WAGENINGEN.
*Jaarverslag 1955, Instituut voor Tuinbouwtechniek, Wageningen.* **(Annual Report for 1955 of the Institute of Horticultural Engineering, Wageningen)**, 1956, pp. 48, illus.

Among the many experiments reported are: the effect on crop growth of plastic substituted for glass; the raising of tomato plants with artificial illumination; soil mulching with aluminium foil or strips of clear plastic; raising cauliflowers in flower pots or soil blocks; the effect of the heating system on the development of tomatoes in glasshouses; glasshouse heating by hot air and radiation; artificial drying of onions; electric heating for chicory forcing; artificial pollination of tomatoes; frost protection; comparisons between high and low volume knapsack spraying; bird scaring with an artificial bird; casing soil for mushroom growing.

1992. INSTITUUT VOOR TUINBOUWTECHNIEK, WAGENINGEN.
*Jaarboek Tuinbouwtechniek 1956.* **(Yearbook of Horticultural Engineering 1956)**, Inst. Tuinbouwtech., Wageningen, 1956, pp. 304, illus.

The publication formerly called *Tuinbouwtechniek* [*H.A.*, 25: 2310] has now been produced as a yearbook, and aims at giving a survey of the year's developments in horticultural engineering for the grower. The information is grouped under the headings: construction of glasshouses; heating and electricity; tractors and implements for soil cultivation; spraying machines; irrigation systems; harvesting, grading and transport apparatus.

1993. IOWA.
**Your Division of Agriculture reports,** being *Annual Report of the Division of Agriculture of Iowa State College for 1955-56,* pp. 76, illus.

This popularly written report includes information on wireworm control with aldrin, endrin and heptachlor, chemical weed control for vegetables in sandy soil, recommended varieties of muskmelon and watermelon, spacing and mulching of strawberries, breeding of hardy rose varieties, high-yielding strawberry varieties, rose varieties resistant to black spot, inhibition of strawberry runners by maleic hydrazide and dichloral urea, chemical control of crabgrass on golf courses, mulching of glasshouse roses, and notes on the new apple varieties Jonadel and Delcon.

1994. LAUSANNE (GALLAY, R.).
Stations fédérales d'essais agricoles, Lausanne. Sous-stations en Valais et au Tessin. Domaines à Caudoz (Pully), Changins (Nyon), La Frûtaz (Bullet). Rapport d'activité 1955. **(Annual report for 1955 of the Swiss Agricultural Research Stations at Lausanne, with sub-stations in Valais and Tessin, and at Pully, Nyon and Bullet.)**
*Landw. Jb. Schweiz*, 1956, **5**: 399-640, bibls., illus.

General administration reports with summaries of current research are included in the first part of this report. Current work is grouped under the following headings: *Plant improvement:* tobacco varieties and culture; vine varieties and rootstocks and culture; pome and stone fruit varieties and rootstocks, and fruit growing methods; vegetable varieties and cultural methods. *Technology of agricultural produce:* storage of apple, tomato, and fruit storage by quick-freezing. *Inspection:* of seeds and plants for propagation, fertilizers and plant protection materials. *Pests and diseases:* diseases of vines, fruit trees, beans and lettuce; San José scale, Mediterranean fruit fly; infectious degeneration of vines, tobacco mosaic on tomato. Part II contains original articles [some of which have been abstracted separately].

1995. Malaya. (Heath, R. G.).
*Annual Report of the Department of Agriculture, Federation of Malaya, for 1955*, 1956, pp. 99, illus., $2.50 or 5s. 10d.

In this pleasantly illustrated report brief notes cover investigational work on the following subjects: *Oil palm:* Breeding and selection, germination, cytology, processing, and pests and diseases. *Coconut:* Selection and breeding, pests and diseases. *Pineapple:* Selection and breeding, analysis of fruits, canning, pests and diseases. *Cacao:* Selection, breeding, processing, pests and diseases. *Tea:* Selection, pests and diseases. *Ramie:* Clonal trials, time of cutting, spacing. *Cloves:* Fungal incidence. *Fruits:* Various problems affecting bananas, durians, citrus, mangosteens and rambutans. Agronomic trials have also embraced many of the above crops especially pineapple, cacao, and tea and two manurial trials are reported with Liberian coffee on deep peat soil. Variety trials are in progress on Manila hemp.

1996. Ministry of Agriculture, Northern Ireland.
*The Research and Experimental Record of the Ministry of Agriculture, Northern Ireland 1954*, Vol. IV, 1956, pp. 138, 5s.

Eight pages are devoted to work at the Horticultural Centre, Loughgall, County Armagh, on: (1) brussels sprouts varieties; (2) apple spraying with DNC followed by one of the following sprays: mercury/copper, lime sulphur and M618, a complex organic mercurial compound containing phenyl mercury oxide; and (3) tomato varieties.

1997. Mysore Department of Agriculture.
*Mysore Agricultural Calendar and Year Book, 1955*, 1956, pp. 264.

This consists of short popular articles on cultivation or other problems which concern numerous crops grown in Mysore. Among them are recommendations on the cultivation of onions and papaws, on utilization of tobacco waste, on insect pests of vegetables and on insect transmission of plant diseases. [See also separate abstracts.]

1998. New South Wales.
*Annual Report of the Department of Agriculture, New South Wales, for the year ended 30th June, 1955*, 1956, pp. 103, illus., 8s. 6d.

*Division of Plant Industry.* Tobacco breeding and field trials. Hop yield and quality tests. Linseed breeding. Studies on castor beans, sunflowers, lavender and pyrethrum. Vegetable breeding, variety trials and seed production. *Division of Horticulture.* Citrus: Control of wastage in storage, propagation, rootstock trials, and preharvest drop sprays. Bananas: plastic bunch covers, irrigation and nutrition. Pineapples: packing frozen fruit. Passion fruit; breeding and pollination. Pome fruits: rootstock trials, thinning and pre-harvest drop sprays, urea foliar sprays, breeding of apples and pears, apple storage, and "twist" of Gravenstein apples. Other fruits and nuts: breeding of cherry, peach, apricot and strawberry, chemical thinning of stone fruits, freezing of stone fruits and berries, peach and apricot pruning, internal breakdown of apricots, manuring of prunes, prune rootstocks, weed and pest control in strawberries, pecan pollination, almond and hazel varieties, propagation and processing of macadamia, binding material for grafts. *Division of Science Services.* Disease and pest control in vegetables, fruits and ornamentals. Chemical residues on apples.

1999. Queensland.
*Annual Report of the Department of Agriculture and Stock for the year 1955-56*, 1956, pp. 126, illus.

The crops and subjects reported on include: *Agriculture Branch.* Tea: Machine harvesting reduced yields in comparison with hand plucking, but an improved machine is being developed. *Horticulture Branch.* Pineapples: CMU showed promise as a herbicide; urea foliage sprays proved inferior to sulphate of ammonia applied to the soil, except perhaps in winter and spring when lack of soil moisture is associated with sub-normal intake of N; applications of α-NAA 60 days before the expected harvest reduced black heart; records show that black heart development occurs about two weeks after a prolonged period of dull and cold weather. Apples: Control of pre-harvest drop; optimum picking date for cold storage; storage problems. Apricots: 2,4,5-T for improving fruit size and colour. Peaches and plums: Cold storage. Grapes: *Phylloxera*-resistant rootstocks; Zn deficiency. Strawberries: Manuring. Avocadoes: Assessment of fruit maturity. Ginger: Higher returns and better quality were obtained by planting and harvesting earlier than is customary. *Science Branch.* Destruction of *Acacia harpophylla* by aerial spraying with 2,4,5-T plus diesel distillate. Pests and diseases of deciduous, tropical and subtropical fruits, tobacco and vegetables. *Cnemical section.* Plant nutrition. *Other crops* under investigation included tobacco, bananas, citrus, papaws, passion fruit, macadamias, figs, custard apples and several vegetables.

2000. Rosewarne (N.A.A.S.).
*First report of Rosewarne Experimental Horticulture Station, 1952-55*, Camborne, 1956, pp. 91.

This first report from this station provides information about the station, its development and crops, and surveys the work which has been undertaken. Sections on bulbs,* anemones* and brassicas have been abstracted separately. Other sections included are as

* To be included in the next number of *H.A.*

follows: *Fruit:* variety trials with currants, gooseberries, raspberries, strawberries and rhubarb. *Vegetables:* variety trials with sweet corn, tomatoes, runner beans and carrots; sowing time for broad beans. *Protected cropping* of vegetables and flowers. *Shelter:* tests with screens, and hedge and tree shelter plants. *Flowers:* varieties of violet; control of red spider on violets with chlorobenzilate; strains of *Chrysanthemum maximum;* trials with polyanthus, *Alstromeria*, *Trollius*, *Ranunculus* and *Helleborus*. *Ellbridge Sub-station:* protected cropping trials with turnips, cut flowers and strawberries; strawberry varieties, weed control and *Botrytis* control; raspberry and black-currant varieties; cultural trials with anemones; control of narcissus fly; chrysanthemum propagation and varieties; lettuce varieties; spacing trial with spring cabbage; root fly control on summer cabbage.

2001. Tysser, H. F. (Editor).
*The Fruit Annual 1956-57.*
British-Continental Trade Press Ltd., Strand, London, 1957, pp. 589, illus., £1.

The current edition of this useful directory contains the usual features and also articles on recent improvements in fruit packaging, especially the use of cartons. There is also a discussion on the use of pallets for mechanized handling in the fruit industry, and an international register of fruit packs.

2002. Wädenswil. (Kobel, F.).
Jahresbericht 1954/1955 der Eidg. Versuchsanstalt für Obst-, Wein- und Gartenbau in Wädenswil. **(Annual Report of the Wädenswil horticultural research station for 1954-55.)**
*Landw. Jb. Schweiz*, 1956, **5**: 855-956, illus.

*Breeding:* Breeding and selection of fruits, vines, strawberries, raspberries, onions and other vegetables, *Primula malacoides* and hydrangeas. *Physiology:* Nutrient deficiency studies on fruits and vines, variations in the mineral contents of fruit trees and their analysis, storage processes in fruits, root development, growth substance studies with apple rootstocks, and morphological studies of pea varieties. *Plant protection:* Testing of fungicides and insecticides, entomological studies, diseases of fruits, vines and vegetables. *Fruit and vegetable utilization:* Storage of apples and pears, testing of fruit grading machines. *Pomology:* Rootstocks, apple frameworking, nutrition studies, properties of soils and environment, regulation of fruit set, training and pruning, walnut propagation and orchard costs. *Viticulture and oenology:* Breeding, nutrition, training and pruning, propagation. *Market gardening:* Variety trials with vegetables, cultural trials with *Erica*, hydrangea and azalea, and trials with soft fruits.

2003. Washington State College.
*Agricultural and Home Economics Research Progress Report No. 9, Horticulture,* May 1956.

Projects on which brief reports are given concern the following among other subjects: Early flowering hardy chrysanthemum varieties; evaluation of new red apple sports; nutrition of small fruit [1] (applications of captan 5% and zerlate 7·6% starting at blossoming time increased yield of strawberries); soil management for stone fruits (mulching proved successful in its second year); cherry cracking (aluminium sulphate and calcium hydroxide sprays reduced losses); blueberry nutrition; red raspberry breeding and selection; small fruit nutrition [2] (use of boron and urea foliage sprays); cranberry breeding and manuring; weed control (CMU and DMU continued to give good annual weed control in raspberries and blueberries); bean irrigation; cabbage seed treatment with N, P, K and Mg.

2004. Wattle Research Institute, Pietermaritzburg.
*Report of the Wattle Research Institute for 1955-56,* 1956, pp. 46+1 plate.

The review of work in progress concerns the following subjects: *Thinning:* There is some evidence that the optimum density over a rotation of 7 years is around 700 trees per acre for conditions similar to those of the Institute. *Genetics and plant breeding:* For want of a simpler method of assessing the tannin content of living trees selection at present has to be based on bark thickness and tree diameter. In progeny testing air-layers have been adopted for the vegetative propagation of selected trees. *Chemistry:* In manurial trials lime has proved beneficial for the first time. A tool has been developed to obtain standard samples of bark. *Entomology:* Biological and chemical control of bagworm. *Miscellaneous:* Destruction of aspen (*Populus tremula*) trees up to 3-in. diameter by spraying the basal two feet thoroughly with a solution of a 2,4,5-T ester in diesel oil. The report also includes the following papers: A. A. Moffett, The black and green wattle progeny trials at Sweetwaters, pp. 30-6; L. L. J. Ossowski, Notes on insects observed during the period 1955–56, pp. 37–41, bibl. 3, illus.; L. L. J. Ossowski, Spraying experiments with insecticides against wattle bagworm (*Acanthopsyche junodi* Heyl.), pp. 42–5, bibl. 1, in which it is shown that both toxaphene and endrin applied by aircraft will give a high kill, provided there is good coverage and deep penetration.

## *New periodicals.*

2005. Deutsche Akademie der Landwirtschaftswissenschaften zu Berlin.
*Landwirtschaftliches Zentralblatt, Abteilung II: Pflanzliche Produktion* [*Landw. Zbl. Abt. II: pflanzl. Produkt.*], 1956, Vol. I, No. 2, 8×6 in., pp. 189–374, Akademie-Verlag G.m.b.H., Berlin.

*Landwirtschaftliches Zentralblatt* is an abstract journal sponsored by the East German Academy of Agricultural Sciences, E. Berlin. It appears in four parts and covers the world literature on agriculture and silviculture. Abstracts on the main subject, Plant Production, are collected in Part II, which is divided into the following 12 sections: Miscellaneous, fundamental research, soil science, soil cultivation, soil improvement and conservation, plant nutrition and manuring, field crops, pastures, horticulture, plant breeding, phytopathology and plant protection, weed control. The editorial committee includes scientists from Western Germany, Poland, Roumania and Hungary.

2006. LANDWIRTSCHAFTLICH-GÄRTNERISCHE FAKULTÄT DER HUMBOLDT-UNIVERSITÄT ZU BERLIN. [BAUMANN, H., EDITOR.]
*Albrecht-Thaer-Archiv* [*Albrecht Thaer Arch.*], 1956, Band **1**, Heft 1/2, Akademie Verlag, Berlin, W.8, pp. 184, illus., D.M.7 per single number, 4 numbers per year.

This new journal was launched on the occasion of the 75th jubilee celebration of the Agri-Horticultural Faculty of the Humboldt University, at Berlin. It aims at covering the whole field of agricultural science. Of the 6 articles, from different stations in East Germany, included in this first number, two are of importance to horticulturists, one of them concerning the growth-stimulating and growth-inhibiting contents of seeds and the other the value of tasting tests for appraising vegetables. [Both of these will be abstracted in *H.A.*, Vol. 27, No. 3.]

2007. MINISTRY OF AGRICULTURE, MEXICO.
*Agricultura Técnica en Mexico.* [*Agric. téc. México*], Vol. **1**, No. 2, 1955, $11\frac{1}{2} \times 8\frac{1}{2}$ in., pp. 48, illus., Secretaría Agricultura y Ganadería, Balderas 94, Mexico, D.F.

This quarterly journal reports on experimental work with agricultural and horticultural crops in Mexico. Most of the work has been done by the Ministry of Agriculture's Office of Special Studies or by the National School of Agriculture. In this number there is a brief account of the activities of the various agricultural research stations in Mexico. The journal is well printed and illustrated.

## *Noted.*

2008.

a AGRICULTURAL RESEARCH INSTITUTE OF NORTHERN IRELAND, HILLSBOROUGH.
*Twenty-ninth Annual Report, 1955-56,* 1956, pp. 44.

b *Amateur Gardening Handbooks,* issued by Collingridge, London, 1957, pp. 92 each, illus., 4s. each.
CAMPBELL, J. G. **Lilies.**
GALBALLY, J. H. W. **Border carnations.**
HUGHES, H. M. **Raspberries and loganberries.**
WOOD, J. P. **Bulbs.**

c *Amateur Gardening Picture Book No. 8,* issued by Collingridge, London, 1957, pp. 60, illus., 7s. 6d.
HUXLEY, A. J. **Indoor plants.**

d AUSTRALIA.
*Thirtieth Annual Report of the Australian Canned Fruits Board for year 1955-56,* 1956, pp. 35.

e AUSTRALIA.
*Thirty-second Annual Report of the Commonwealth Dried Fruits Control Board for the year 1955-56,* Melbourne, 1956, pp. 23.

f AUSTRALIA.
*Twenty-eighth Annual Report of the Australian Wine Board for year 1955-56,* Adelaide, 1956, pp. 18.
Production and exports.

g BERMUDA.
*Report of the Bermuda Department of Agriculture for 1955,* pp. 12.

h CANADA, NATIONAL RESEARCH COUNCIL.
*The National Research Council Review 1956,* being **N.R.C. 3976,** 1956, pp. 284, illus., 75 cents.

i CYPRUS (LYSSIOTIS, P.).
*Annual Report for 1955. Annexure VI. Annual Report of the Oenologist for 1955,* 1956, pp. 6.

j EDINBURGH AND EAST OF SCOTLAND COLLEGE OF AGRICULTURE.
*Report for the year ending 30th September, 1956,* pp. 128.

k MINISTRY OF AGRICULTURE, LONDON.
*Agricultural Statistics 1954-55. England and Wales,* H.M.S.O., London, 1956, pp. 105, 5s. 6d.

l NEBRASKA.
*Sixty-ninth Annual Report of the Nebraska Agricultural Experiment Station for 1955,* 1956, pp. 16.
New projects listed.

m NEW YORK.
*Seventy-fourth Annual Report New York State Agricultural Experiment Station, Geneva, for 1955,* pp. 25.
Lists of projects, publications, staff, etc.

n PENNSYLVANIA.
**69th Annual Report of the Pennsylvania Agricultural Experiment Station for 1955/56.**
*Bull. Pa agric. Exp. Stat.* **612,** 1956, pp. 24.
Current activities listed.

o SIERRA LEONE (GREEVES, T. N.).
*1954 Report on the work of the Department of Agriculture,* 1956, pp. 33, 3s. 6d.

p SINGAPORE (PURSEGLOVE, J. W.).
*Annual Report of the Botanic Gardens Department for 1955,* 1956, pp. 18, illus., $1.
Including notes on orchid hybrids and raising orchid seedlings.

q SURINAME.
*Jaarverslag Departement van Landbouw, Veeteelt en Visserij, Suriname, over 1953.* (**Annual Report of the Surinam Department of Agriculture for 1953**), 1956, pp. 116.
Includes work on coconut, oil palm, citrus, banana, pineapple, cacao, coffee, fibre crops and vegetables.

r TANGANYIKA.
*Report and Accounts, Tanganyika Agricultural Corporation, for the period 1st April to 30th September, 1955,* 1956, pp. 83, 4s.
Successor to Overseas Food Corporation, reporting on first 6 months' work.

s UNITED STATES DEPARTMENT OF AGRICULTURE.
*Report of the Secretary of Agriculture 1955,* 1956, pp. 60.

t WEST OF SCOTLAND AGRICULTURAL COLLEGE.
***Farm and Experiments 1956,*** 1956, pp. 82, maps.
Including experiments on tomatoes and chrysanthemums, and fruit and vegetable variety trials.

u WISCONSIN.
**What's new in farm science,** being *72nd Annual Report, Part I, Wisconsin Agrivultural Experiment Station for year ending June 30, 1955,* 1956, pp. 60, illus., issued as *Bull.* **518.**
No horticulture in this part.